Keep (ms)
2/16/76

UNITED NATIONS

ECONOMIC
AND
SOCIAL COUNCIL

LIMITED
E/CN.12/L.19
June 1967

ENGLISH
ORIGINAL: SPANISH

ECONOMIC COMMISSION FOR LATIN AMERICA
Santiago, Chile

THE INDUSTRIAL DEVELOPMENT OF BRAZIL

prepared by the
Banco Nacional do Desenvolvimento Econômico (BNDE) of Brazil

and submitted by the secretariat of the
Economic Commission for Latin America

Note: This document has been distributed in Spanish for the United Nations International Symposium on Industrial Development, Athens, 29 November-19 December 1967, as document ID/CONF.1/R.B.P./3/Add.3.

EXPLANATORY NOTE

Resolution 250 (XI) of 14 May 1965, adopted by the Economic Commission for Latin America (ECLA) at its eleventh session, requested the Latin American Governments "to prepare national studies on the present status of their respective industrialization processes for presentation at the regional symposium". With a view to facilitating the task of the officials responsible for the national studies, the ECLA secretariat prepared a guide, which was also intended to ensure a certain amount of uniformity in the presentation of the studies with due regard for the specific conditions obtaining in each country.

Studies of the industrial development of fourteen countries were submitted to the Latin American Symposium on Industrial Development, held in Santiago, Chile, from 14 to 25 March 1966, under the joint sponsorship of ECLA and the Centre for Industrial Development, and the Symposium requested ECLA to ask the Latin American Governments "to revise, complete and bring up to date the papers presented to the Symposium".

The work of editing, revising and expanding the national monographs was completed by the end of 1966 and furthermore, two new studies were prepared. The ECLA secretariat attempted, as far as possible, to standardize the presentation of the reports, in order to permit comparison of the experience of the different countries with regard to specific problems, particularly in the field of industrial policy.

The national studies on industrial development, to be presented to the International Symposium relate, in alphabetical order, to the following countries: Argentina, Bolivia, Brazil, Central America, Chile, Colombia, Cuba, Ecuador, Guyana, Mexico, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay and Venezuela.

/TABLE OF

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
II.	HISTORICAL OUTLINE OF BRAZIL'S INDUSTRIAL DEVELOPMENT AND THE STRATEGY OF THE SAME	2
	1. Background information	2
	2. General strategy of industrial development	8
III.	RELATIVE IMPORTANCE, STRUCTURE AND GENERAL CHARACTERISTICS OF MANUFACTURING INDUSTRY	13
	1. Manufacturing industry's contribution to the total product	13
	2. Industrial employment in the total active population	16
	3. Contribution of the chief branches of industry to manufacturing industry as a whole	17
	4. Characteristics of foreign trade in manufactured products	21
	5. Sectoral programmes and agencies	22
	6. Private initiative in industrial programming	27
	7. The financing of manufacturing industry	27
	8. Location of industry	30
IV.	POLICY MEASURES FOR INDUSTRIAL DEVELOPMENT	33
	1. Government industrial promotion activities	33
	2. Customs protection	35
	3. Industrial credit policy	35
	4. Tax policy as a means of promoting and channelling industrial investments	37
	5. The legal régime governing foreign enterprises and capital	39
	6. Promotion policy for exports of manufactures	44
	7. Provisions for small-scale industry	48
	8. Direct state promotion through public or mixed enterprises	49
	9. Regional industrial development policy	53
	10. Development policy for the infrastructure sectors	62

/11. Productivity

Page

11. Productivity and industrial extension services... 65
12. Technological research.............................. 67

V. CHIEF SECTORS OF MANUFACTURING INDUSTRY.............. 69

1. Steel.. 69
2. Cement... 72
3. Non-ferrous metals................................... 75
4. Motor vehicle industry............................... 98
5. Chemical industry.................................... 100
6. The ship-building industry........................... 123
7. Machine-tools.. 125

VI. EXTERNAL DEVELOPMENT FINANCING...................... 128

/I. INTRODUCTION

I. INTRODUCTION

The Brazilian delegation herein submit to the Latin American delegates of the Latin American Symposium on Industrial Development and to the observers from other countries a study intended to marshal the main facts of the evolution of their country's industrial sector from the thirties onwards and to determine the nature of the present and succeeding stages of its industrial development process.

The present work includes a description of the instruments which have had most influence on the formation of the industrial nucleus and points out the more dynamic characteristics and the obstructive elements in this latter.

It was the intention of the Brazilian delegation to submit a study which besides providing information on this major aspect of their country's economy would bring to the consideration of the Latin American countries the main problems which it will be necessary to solve in this field, especially if it is desired to accelerate the development process in Latin America. The delegation believe that in this connexion it would be most useful and opportune if, in the discussions of the Symposium, particular attention was paid to problems relating to productivity and complementarity; for the Latin American economies have not so far succeeded in making full use of the productive factors which they already possess.

This problem is linked to another, of maximum importance, since it does much to prevent the attainment of more rapid economic growth rates, namely the inadequacy and narrow diffusion of technical knowledge in the region. The present Symposium might, therefore, suitably attempt to formulate a regional system that would promote the discovery of new techniques in Latin America, a more rapid absorption of foreign technology and the adaptation of this latter to the natural resources of each country in the region.

On submitting their study to the Symposium the delegation wishes to make it clear that during the period in which it was being prepared and printed some of the situations described, particularly in the field of fiscal arrangement, underwent modifications too late for the corresponding alterations to be made in the text.

/II. HISTORICAL

II. HISTORICAL OUTLINE OF BRAZIL'S INDUSTRIAL DEVELOPMENT AND THE STRATEGY OF THE SAME

1. Background information

Brazil's economic development, particularly as regards the industrial sector, took place during the thirties and, at a greater pace, the period after the Second World War. In this post-war period the economic growth rate was high: between 1947 and 1961 the gross domestic product increased by an annual average of 5.8 per cent, equivalent to 3 per cent annually per inhabitant and higher than the rates achieved by the European Common Market and Latin America as a whole. Between 1957 and 1961 the increase was especially rapid: 7 per cent a year on average.

This growth was influenced by the specific characteristics of the modern world, in which the underdeveloped countries tend to follow the consumption patterns of the more developed ones, and by two world events, the slump of 1930 and the Second World War, both of which caused considerable changes in the Brazilian economy.

The slump, which came as an addition to an already unfavourable situation in the coffee trade, reduced the country's capacity to import at a time when domestic policy was strongly concerned to maintain income and employment levels. In these circumstances, while nominal incomes remained relatively constant the consumer goods normally provided by foreign production were in short supply; a domestic demand was created that could only be satisfied by the domestic production sector, resulting in the appearance of a considerable number of import-competitive industries. Taking 1925 as base year (1925 = 100), the industrial production index rose to 160 in 1935-1939.

These factors were reinforced by the effects of Second World War. For the duration of the fighting the economically advanced countries had to devote much of their resources to the manufacture of war materials, which cut off the supply of manufactured goods and raw materials to foreign countries. On being deprived of various imported manufactures, the Brazilian domestic market began to supply itself from domestic sources, and new industries were created.

/Once these

Once these foundations had been laid the industrial sector was greatly favoured by government foreign trade measures and the exchange system. The quantitative import controls that limited the inflow of foreign products from 1948 to 1953 and the system of multiple exchange rates stimulated the import substitution process, especially in durable consumer goods.

Subsequent partial reforms of the exchange system contributed still further to industrial promotion. These culminated in Instruction N° 204 [1] of the Superintendency of Currency and Credit (SUMOC) - an agency recently abolished - which devalued the currency from 100 to 200 cruzeiros to the dollar and thus encouraged the creation of import-substituting domestic industrial units and stimulated exports.

It would appear, then, that even before the sixties the Brazilian economy had undergone structural modifications of some note. These are illustrated in table 1.

The data given in table 1 show conclusively that Brazil's development is reducing demand for foreign final consumer goods, intermediate goods and equipment. This reduction becomes still more obvious from table 2, which shows the extent of domestic substitution of imported equipment during 1949-1958.

It is worth mentioning that both during the thirties and after the war until, at least, 1952 industrial development in Brazil did not occur in an ordered fashion but depended on conditions in the external sector. In an economy which was gradually changing from an exporter of primary commodities into a producer of industrial goods for domestic consumption, the dynamism of some sectors was held up by the inadequacy of others concerned with the basic infrastructure.

This form of bottleneck was particularly characteristic of the basic service sectors, above all energy and transport. These difficulties, combined with the overall need to give the Brazilian economy better promotion instruments, led the Federal Government to institute by Law 1,474 of 26 November 1951 a forced war in the form of a surcharge on the income tax paid by natural and legal persons, with a view to creating a fund for the renewal of equipment.

---

[1] An "instruction" has the legal force of a decree but is issued by a government agency, not the President.

/Table 1

Table 1

BRAZIL: COMPARISONS OF FOREIGN AND DOMESTIC SUPPLY INDICES

	Percentages increase between 1950-51 and 1960-61	Annual rate of increase (Percentages)
Total foreign supply	39	3.3
Total domestic supply	77	6.0
Imports of food products	30	2.3
Imports of consumer manufactures	-58	-4.5
Total consumption	68	5.3
Imports of equipment	41	3.5
Imports of raw materials	85	6.3
Industrial production	144	9.3

Source: Plan Trienial de Desenvolvimento Econômico e Social, 1962.

/Table 2

Table 2

BRAZIL: SHARE OF IMPORTS IN EQUIPMENT SUPPLIES

(At current prices)

	1949			1956		
Sectors	Value of the supply of equipment to the sector (Millions of cruzeiros)	Percentage of total supply	Percentage of imports in the sector's supply	Value of the supply of equipment to the sector	Percentage of total supply	Percentage of imports in the sector's supply
Agriculture	1 195.2	8.0	70.8	8 888.0	9.7	50.6
Transforming industries	3 481.6	23.3	68.4	21 782.4	23.7	52.2
Electric power	1 454.6	9.7	24.5	10 016.9	10.9	13.2
Transport	6 848.8	45.8	42.8	40 368.4	43.9	24.4
Services	1 979.6	13.2	68.8	10 801.6	11.8	28.4
Total	14 959.8	100.0	52.7	91 857.3	100.0	32.8

Source: *Plan Trienial de Desenvolvimento Econômico e Social*, 1962.

This measure - which had been suggested in the Brazil-United States Mixed Commission's study - was designed to provide financing for projects for improving and extending the national transport and energy generating systems there recommended.

Subsequently, on 20 June 1952, Law 1,628 set up the National Bank of Economic Development (Banco Nacional de Desenvolvimento Econômico or BNDE) as the agent responsible for all financial operations connected with the economic re-equipment programme. This institution at first only financed transport and energy projects, but as its growing capacity to mobilize savings enabled it to increase its resources for use in other productive sectors of the economy an effective policy of industrial diversification was put into practice under which the Bank took an increasing part in the financing of basic industries and durable consumer goods production, such as the motor vehicle industry.

The Bank's activities, however, have not only tended to encourage industrial investments by providing favourable terms of duration and interest rates, but have also made for suitable selection and guidance of these investments through the use of sectoral priority norms, studies and analyses of specific projects carried out before granting of loans, and supervision of the application of the funds provided, bearing in mind its basic function as a development financing agency.

One of the most important instruments for channelling counterpart investments of foreign provenance into priority sectors was Law 1,807 of January 1963 and its subsequent regulatory decrees. This law required prior registration of foreign investments and loans, allowing then more or less preferential treatment according to the importance of the sector for which they were destined.

In order to stimulate Brazil's industrial development and discourage or restrain demand for imported consumer goods, and in view of the fact that her foreign exchange supply was inadequate for the growing needs of the economy, the pattern of Brazilian imports was altered. Among the measures adopted to this effect the chief was the setting up of multiple exchange rates by Instruction 70, October 1953, of the now extinct Superintendency of Currency and Credit. Under this, more favourable exchange rates could be applied to imports of machinery, equipment and raw materials essential to the development of the industrial inventory, while those of goods produced in the country could be taxed. In 1957 this function was transferred from the exchange to the fiscal sphere by reform of the tariff legislation, which was turned into an instrument for protecting domestic production in general while retaining differential treatment designed to enable the productions incipient branches of industry to be sold competitively.

In addition to indirect industrial promotion in the form of fiscal, exchange and credit incentives the public sector, at the beginning of the industrial development process, also engaged in extensive entrepreneur

/activity, particularly

activity, particularly in new industries or branches in which the private sector was not playing a satisfactory part. Among the public enterprises or mixed companies thus created are the National Steel Company, set up in 1943, the São Francisco Hydroelectric Company, set up in 1948, the National Motors Factory, the National Alkalis Company, the Vale do Rio Doce Company and the Brazilian Petroleum Corporation. These last three are of importance to the security of the country.

A further policy measure was the creation of Executive Groups for guiding the private sector in the establishment and development of certain industries. These collegiate bodies are made up of representatives of the federal agencies which take part in programming and are responsible for programming the production lines of their respective industrial branches and for the executive work of studying, negotiating and approving specific projects relating to these industries. Examples of these groups are: the Executive Group for the Motor Vehicle Industry (GEIA), for the Ship-building Industry (GEIN), for the Agricultural and Road Machinery Industry (GEIMAR), for the Heavy Metal-transforming Industry (GEIMAPE) and the Metallurgic Industry (GEIMET). In 1965 new groups were created and the old ones reorganized.

The incentives provided for industrial investments speeded up the formation of a diversified industrial inventory to such an extent that by the beginning of the present decade Brazil was already supplying much of its domestic market from its own production.

The rapidity of industrial expansion was the factor that contributed most to the economic development rate attained (whose maximum was nearly 8 per cent a year). However, owing to the accompanying inflation this growth involved a number of distorting factors. While inflation apparently favours capital formation by stimulating the prosperity to consume and thus encouraging new productive investments, it also distorts the siting and size of the industrial inventory and its development in relation to production and sales costs, creating sectoral and regional disequilibria that cannot quickly be eliminated.

The internal disequilibrium helped aggravate the external, especially from 1955 onwards, when coffee prices began to fall.

It is worth noting that while this was ocurring the industrial development process was entering the equipment production stage, which inevitably requires large investments. The rate of fixed capital investment could only be maintained by an increase in the contribution of foreign funds to domestic capital formation, which led to a continuous rise in the country's foreign debts. Obviously this situation could only end in the adoption of an essentially corrective economic policy.

Anti-inflationary, combined with economic promotion measures began to be applied in 1964 under the Government Economic Action Programme for 1964/1966, which established certain objectives to be attained in those two years. The chief of those favouring industry were as follows:

- Fiscal incentives to increased saving;
- A credit policy in keeping with the growth of production and rise in costs, applied in co-operation with the banks;
- An immediate incentive to investment in a number of sectors (chemical, textiles, cement, food products and footwear) in the form of a more rapid depreciation rate for new equipment;
- Financing for manufactured exports;
- The creation of the Fund for Financing Purchases of Industrial Machines and Equipment (FINAME);
- The creation of a financing fund (FIPEME) for assisting medium-and-small-scale enterprises.

Through these and other measures further encouragement was given to industrial development in the hope of recovering the industrial growth rate achieved in the recent past.

2. General strategy of industrial development

As was remarked above, the considerable reduction in the capacity to import that took place from 1945 onwards made it necessary to alter the structure of internal supply, and this led the Government to adopt certain measures for planning industrial development. One previous attempt

/had been

had been made at planning - the so-called SALTE plan for 1950-1954 -, but in general knowledge of the nature of the economic development process was too incomplete to allow more than the preparation of partial plans for overcoming under-development.

In that period a number of foreign and foreign-Brazilian missions made studies of Brazil's economy. Among these were the Cooke Mission, the Abbink Mission, the Brazil-United States Mixed Commission and, most recently, the Economic Comission for Latin America/BNDE Group, which was organized in a systematic fashion.[2] These studies provided the foundations for the Target Plan of 1957-1961, during which period the Development Council was created for the purpose of co-ordinating economic policy measures, improving the efficiency of government activities and encouraging private initiative.

Although planning had begun to be institutionalized in this period it was not subject to an overall programme but merely to trial programming of investments in sectors considered basic to the economy (in particular, energy, transport and basic industries). The BNDE became the chief instrument for financing this programme at the national level and thanks to its capacity to channel and mobilize savings both efficiently and rapidly a great deal was done in the different sectors with which it was concerned. It was the chief and often the sole domestic source of funds for the projects for extending the energy system, expanding basic industries and improving the transport networks.

The Government Triennial Plan included policies concerned with capital formation. It stressed the need to step up activity in the following fields:

(a) Pre-investments for extending economically exploitable natural resources;

(b) Pre-investments for training human resources;

(c) Investments for speeding up structural changes, whether by opening up new territories to economic activity or by promoting activities conducive to structural changes proper, such as a reduction in the import coefficient.

---

[2] See, Analyses and Projections of Economic Development II. The Economic Development of Brazil, ECLA/BNDE, April 1956, (E/CN.12/364/Rev.1).

/These investments

These investments and pre-investments were to be financed from two sources:

(a) Resources in national currency to be provided mostly by foreign sources and partly by the Government;

(b) Resources in foreign currency for imports of goods and services without equivalents in the country, to be provided partly by foreign sources and partly by the Government.

The part corresponding to expenditure within the country was to be financed by:

(a) Reinvestment of profits and reserves;

(b) The sale of company shares or other securities in the capital market;

(c) Obtaining finances (in the form of loans or not) from private finance institutions;

(d) Government financing or that of its finance agencies, or direct contribution of these to the capital of enterprises concerned.

The BNDE was to supply part of the resources needed for encouraging private initiative, and the creation of a special fund for financing the manufacture and sale of capital goods was envisaged

In 1964 the desire to recover the high industrial growth rates achieved until 1961 [3] gave rise to the Government Economic Action Programme. In view of the need to encourage capitalization, the following measures were considered indispensable:

(a) Tax incentives to reinvestment of profits in enterprises and in remunerations of personnel, combined with heavy taxes on superfluous consumption;

(b) The creation of bearer securities attractive to small- and medium-scale enterprises;

(c) An incentives policy for attracting foreign capital;

(d) The establishment of compulsory capitalization schemes for users of public utility services;

(e) The elimination of exchange subsidies to consumption of imported products.

---

[3] 9.7 per cent annually was the average during 1947-1961.

/It was

It was proposed also to encourage savings by adopting anti-inflationary measures. But in spite of the efforts made the programmed objectives were in almost every case of a sectoral character. The size and diversity of the problems of the Brazilian economy and the lack of statistical information and proper training in the government sector still prevent a satisfactory articulation of sectoral and overall objectives. The Government is, however, trying to eliminate the outstanding obstacles to economic development and at the same time is making the first steps towards the development of a long-term development plan in which the sectoral targets will be interdependent and based on an integral approach.

(a) Executive agencies with responsibilities in industrial development

(i) Finance agencies. The most important agency in the industrial field in Brazil as regards development activity has been and continues to be the BNDE. It provided most of the financing needed to create the basic industries and infrastructural sectors and also finances fixed investments in industry with long-term, low-interest loans of by guaranteeing loans obtained abroad.

At the national level the work of the BNDE in financing industrial development has been supplemented by that of the Bank of Brazil, through its Agricultural and Industrial Loans Portfolio, which mainly serves small- and medium-scale enterprises. The many finance agencies operating at the interstate or state level will be considered in detail below.

Some reference may also be made to the Advisory Council on Planning, a top-level body of recent creation, which works in co-operation with the Ministry of Planning, consists of representatives of different socio-economic categories and has the function of suggesting economic policy measures to the Federal Government.

(ii) Other agencies. The Executive Groups mentioned above have the task of rationalizing and increasing the efficiency of government action and are responsible for formulating and implementing special programmes designed to create and consolidate sectors basic to the expansion of the national economy. They have powers in connexion with fiscal incentives and can recommend the finance agencies and the Government to grant priority loans for specific projects. Within this overall framework there are no limitations on the establishment of new industries in Brazil; it is only in order to obtain financial resources from official credit agencies that they must be, and be proved to be, in conformity with the government development programmes.

Decree 53,975 of 19 June 1964 recognised or created the following groups:

(a) Executive Group for the Metal-transforming Industries (GEIMEC), which replaced the Executive Groups for the Motor Vehicle Industry, for the Agricultural and Road Machinery Industry (GEIMAR) and for the Heavy Metal-transforming Industry (GEIMAPE).

(b) Executive Groups for the Textiles, Leather and Leather Articles Industries (GEITEC), which replaced the Executive Groups for the Textiles Industry (GETEC) and for the Footwear Industry (GECAL);

(c) Executive Group for the Chemicals Industry (GEIQUIM), which was formed out of the Executive Groups for the Pharmaceutical Industry (GEIFAR) and for the Fertilizers Industry (GEIFERT);

(d) Executive Group for the Metallurgic Industry (GEIMET);

(e) Executive Group for the Cinematographic Industry (GEICINE);

(f) Executive Group for the Electronics and Telecommunications Industry (GEITEL);

(g) Executive Group for the Food Products Industry (GEIPAL).

These groups all collaborate with the Federal Government; they have recently been supplemented by the Executive Group for Transport Policy (GEIPOT).

/III. RELATIVE

III. RELATIVE IMPORTANCE, STRUCTURE AND GENERAL CHARACTERISTICS OF MANUFACTURING INDUSTRY

1. Manufacturing industry's contribution to the total product

The development of the Brazilian economy during 1947-1960, which was especially notable in industry, raised the secondary sector's contribution to the net domestic product from 21.4 per cent in the first year to 25.8 per cent in the last, while during the period this product had grown at an average annual rate of 5.8 per cent.

Table 3 gives statistical data on these points.

Table 3

BRAZIL: EVOLUTION OF THE DOMESTIC PRODUCT, 1947-1960

(In thousand millions of current cruzeiros)

Years	Net domestic product (A)	Net product of the secondary sector (B)	Percentage (B/A)
1947	140.2	30.0	21.4
1948	158.5	34.2	21.6
1949	181.6	39.8	21.9
1950	214.4	51.1	23.8
1951	254.5	64.2	25.2
1952	293.3	68.9	23.5
1953	360.3	88.4	24.5
1954	455.9	119.3	26.2
1955	579.1	142.3	24.6
1956	733.6	176.7	24.1
1957	871.9	203.9	23.4
1958	1 056.2	264.9	25.1
1959	1 418.5	358.7	25.3
1960	1 905.3	490.4	25.8

Source: Revista Brasileira da Economia, March 1962.

/It is

It is estimated that industrial production showed a considerable increase in the period under consideration, especially in the manufacturing sector, as appears from table 4.

Table 4

BRAZIL: INDUSTRIAL PRODUCTION INDICES, 1947-1960

Years	Industries				Total for industry
	Manufacturing	Mining and quarrying	Civil Construction	Electric power	
1947	80.3	84.1	90.2	88.9	81.4
1948	90.1	100.9	93.9	94.4	90.6
1949	100.0	100.0	100.0	100.0	100.0
1950	112.7	96.8	101.7	105.8	111.4
1951	119.0	118.2	115.4	111.1	118.5
1952	125.4	114.2	126.0	105.0	124.4
1953	137.1	123.2	134.6	101.4	135.2
1954	150.0	120.7	130.5	114.1	146.7
1955	166.4	129.2	137.9	130.5	162.3
1956	176.7	143.5	156.5	147.6	173.5
1957	186.5	148.4	162.7	166.9	183.2
1958	217.7	175.2	184.0	185.8	213.2
1959	245.7	218.5	...	198.8	240.7
1960	271.8	247.8	...	217.1	266.3

Source: Revista Brasileira da Economia, March 1962.

/Table 5

Table 5 shows the formation of fixed capital in the Brazilian economy in 1949 and 1958 by sectors, distinguishing between equipment and buildings.

Table 5

BRAZIL: FIXED CAPITAL FORMATION BY SECTORS, 1949 AND 1958

(Current prices)

	1949			1958		
	Value (Million cruzeiros)	Percentage of total	Percentage for equipment	Value (Million cruzeiros)	Percentage of total	Percentage for equipment
Equipment:	14 959.8	42.2	100.0	91 857.3	51.0	100.0
Agriculture	1 195.2	3.4	8.0	8 888.0	4.9	9.7
Manufacturing industry	3 481.6	9.8	23.3	21 782.4	12.1	23.7
Electric power	1 454.6	4.1	9.7	10 016.9	5.6	10.9
Transport	6 848.8	19.3	45.8	40 368.4	22.4	43.9
Services	1 979.6	5.6	13.2	10 801.6	6.0	11.8
Buildings:	20 473.1	57.8	-	88 165.7	49.0	-
Total	35 432.9	100.0	-	180 023.0	100.0	-

Source: Plan Trienial de Desenvolvimento Econômico e Social, 1962

/2. Industrial

2. Industrial employment in the total active population

In spite of the shortage of statistics it is known that Brazil's industrial development has created profound changes in the composition and movement of manpower.

Thus, industrialization required an additional labour force, skilled and unskilled, which came largely from rural activities whose real wages are lower than those in industry. At the same time a marked process of urbanization began, creating a need for housing and, consequently, for unskilled building workers.

Table 6 shows the active population and the persons employed in manufacturing industry according to three different censuses.

Table 6

BRAZIL: ACTIVE POPULATION AND PERSONS EMPLOYED IN MANUFACTURING INDUSTRY, 1939, 1949 AND 1959

	1939		1949		1959	
		Percentage		Percentage		Percentage
Active population (thousands of inhabitants of 15 years of age or over)	23 710	100	30 249	100	40 188	100
Persons employed in manufacturing industry (thousands of persons)	669.3	2.82	1 095.1	3.62	1 474.3	3.66

Source: Recenseamentos Demograficos e Industriales.

/3. Contribution

3. Contribution of the chief branches of industry to manufacturing industry as a whole

Table 7 gives the contribution of two major groups of industries to manufacturing industry as a whole for the years of the three last general censuses (1939, 1949, 1959). Group I comprises the traditional industries and shows a much smaller development during the period than group II, which consists of the dynamic sectors characteristic of the industrial countries or more advanced developing countries.

Table 7

BRAZIL: STATISTICS ON MANUFACTURING INDUSTRY

(Percentages)

	Group II a/			Group I b/		
	1939	1949	1959	1939	1949	1959
1. Number of establishments	17.8	24.2	29.8	82.2	75.8	70.2
2. Wages paid to operatives	26.8	35.4	46.7	73.2	64.6	53.3
3. Production value	24.8	29.6	47.0	75.2	70.4	53.0
4. Value added	30.0	36.1	52.3	70.0	63.9	47.7

a/ Non-metallic minerals; metallurgy; metal-transforming; electrical material; communications; transport; paper and paperboard; rubber; chemicals and pharmaceutical products.

b/ Wood and furniture; leather, hides and similar articles; textiles; wearing apparel and footwear; food products; beverages and tobacco; printing, publishing and allied; miscellaneous.

Note that during 1949-1959 the manufacturing product grew at an average annual rate of 9.5 per cent; the industries of group II must, therefore, have grown considerably faster than this.

Tables 8, 9 and 10, which provided the basis of the table above, give further details on the evolution of the different industrial sectors in the period under consideration.

/Table 8

Table 8

BRAZIL: CENSUS STATISTICS ON INDUSTRY AS OF 1 JANUARY 1940

Industries	As of 1 January 1940	1939		
	Number of establishments	Remunerations to operatives	Production value	Value added
		In thousands of cruzeiros		
Manufacturing industry	40 989	1 548 888	15 643 006	6 423 881
Non-metallic minerals	4 861	96 978	584 196	340 370
Metallurgy	1 460	154 046	987 573	488 562
Metal-transforming Electric and communications material Transport material	964	71 897	773 331	352 888
Wood Furniture	5 614	117 975	691 519	342 775
Paper and paperboard	228	22 752	274 551	94 036
Rubber	65	6 954	92 030	41 267
Leather, hides and similar	1 297	23 481	295 911	108 763
Chemical industry Medical and pharmaceutical preparations Perfumes, cosmetics, etc. Plastic products	1 610	61 821	1 170 337	611 567
Textile industry	2 212	405 077	3 618 574	1 412 628
Wearing apparel and footwear	3 218	92 722	731 953	310 194
Foods products	14 905	222 857	4 927 324	1 511 366
Beverages Tobacco	1 701	44 475	687 686	424 594
Printing, publishing and allied	2 207	68 876	410 877	229 491
Miscellaneous	635	20 634	194 155	70 244

Source: Recenseamento Geral do Brasil, Vol. III, p. 168.

/Table 9

Table 9

BRAZIL: CENSUS STATISTICS ON INDUSTRY AS OF 1 JANUARY 1960

Industries	As of 1 January 1960	1959		
	Number of establishments	Remunerations to operatives	Production value	Value added
		In millions of cruzeiros		
Manufacturing industry	108 163	100 196	1 172 568	536 445
Non-metallic minerals	18 127	7 775	53 396	35 749
Metallurgy	4 764	13 193	123 894	69 975
Metal-transforming	1 688	4 380	33 615	18 600
Electric and communications material	972	3 881	45 250	20 964
Transport material	2 014	5 957	79 328	40 534
Wood	11 191	4 051	31 207	17 472
Furniture	8 140	3 380	21 737	11 903
Paper and paperboard	766	2 622	35 255	16 419
Rubber	301	1 341	25 524	12 153
Leather, hides and similar	2 350	1 301	12 778	5 901
Chemical industry	1 777	5 337	106 499	46 850
Medical and pharmaceutical preparations	506	1 055	23 082	13 470
Perfumes, cosmetics, etc.	1 070	620	17 974	7 520
Plastic products	291	631	7 758	4 455
Textile industry	4 267	18 911	147 481	64 576
Wearing apparel and footwear	7 632	5 153	40 206	19 227
Food products	33 449	11 765	285 151	89 167
Beverages	3 039	2 123	27 974	15 698
Tobacco	278	786	13 167	7 046
Printing, publishing and allied	3 358	3 704	26 917	16 178
Miscellaneous	2 189	2 148	14 375	8 646

Source: *Anuário Estatístico do Brasil*, 1964.

/Table 10

Table 10

BRAZIL: CENSUS STATISTICS ON INDUSTRY AS OF 1 JANUARY 1950

Industries	As of 1 January 1960	1949		
	Number of establishments	Remunerations to operatives	Production value	Value added
		In millions of cruzeiros		
Manufacturing industry	82 154	10 935	107 128	47 584
Non-metallic minerals	12 777	920	4 835	3 428
Metallurgy	2 221	1 197	8 137	4 469
Metal-transforming	762	324	1 718	1 018
Electric and communication material	341	183	1 501	763
Transport material (manufacture and assembly)	539	263	2 477	1 062
Wood	7 562	494	3 634	2 009
Furniture	2 882	388	1 700	1 090
Paper and paperboard	441	224	2 132	1 072
Rubber	119	124	1 722	902
Leather, hides and similar	2 104	155	1 630	627
Chemical and pharmaceutical industry	2 658	698	9 196	4 451
Textile industry	2 941	2 858	20 026	9 358
Wearing apparel, footwear and cloth articles	5 076	641	4 649	2 034
Food products	32 975	1 377	34 302	9 763
Beverages	4 354	265	3 948	2 111
Tobacco	252	140	1 474	680
Printing, publishing and allied	2 749	507	3 031	1 899
Miscellaneous	1 581	237	1 532	907

Source: National Census Service.

/4. Characteristics

4. Characteristics of foreign trade in manufactured products

Development in recent years has left the Brazilian less dependent on exports. Import substitution and the virtual stagnation in the value of exports have reduced their share in the gross domestic product from 20 per cent in 1925-1929 to approximately 7 per cent at present.

The predominance of primary commodities in these experts and their lack of diversification means that foreign exchange supplies depend heavily on some few products. About 50 per cent derives from exports of coffee beans and approximately 22 per cent more from raw cotton, iron ore, sugar, cocoa, beans and pine wood. In 1960-1962 fifteen primary commodities, with coffee beans at the head accounted for 88.5 per cent of the value of Brazilian exports.

As can be seen in table 11, the export value was stagnant during 1955-1964, being in the first year 1,423 million dollars and in the last only 1,429 million. In the intervening years, except for 1956, it was lower than in 1955 and averaged 1,336 million dollars during the period.

As regards the quantum of exports, there was an increase of approximately 135.8 per cent over the same period, which shows the great decline in prices of the main export products during it.

The evolution of the structure of exports during 1955-1964 is illustrated in tables 11 to 14. In 1955, 98.9 per cent of their value corresponded to primary commodities and just 1.1 per cent to manufactures and semi-manufactures. In 1964 these proportions were, respectively, 95 and 5 per cent.

Sub-dividing primary commodities into raw materials and food products, it appears that between 1955 and 1960 there was no appreciable change in the share of each of these in total exports; they then represented 24 and 74 per cent respectively. In 1961 raw materials began gradually to increase their proportion and food products to diminish. In 1964 the respective percentages of the total export value were 30.3 and 64.4.

With respect to exports of manufactures and semi-manufactures, it is interesting to note the different changes in the quantum and the value from 1959 onwards. In 1964 the former had increased by 1 421 per cent on 1959 and the latter by 43.1 per cent. These increases were not, however, of great significance in the total volume and value of exports since the share of manufactures and semi-manufactures in the latter was still small. The value of exports of these was only 15,200,000 dollars in 1964, rose to 69,900,000 dollars in 1964 and in the first half of 1965 was 46 million dollars, which was equivalent to 7 per cent of the total export value for that half-year.

Thus, in spite of rapid industrialization, the composition of exports showed no change up till 1959. In 1960-1964, however, the share of manufactures and semi-manufactures registered a gradual increase. The shortness of this period makes it impossible to view the recent values as indicative of a change in the previous trend, but it may be hoped that the consolidation of the Brazilian industrial inventory and the monetary stability that seems within reach in the near future will lead to diversification of the country's exports.

5. Sectoral programmes and agencies

As was stated above, the Executive Groups are specifically concerned with sectoral industrial development programmes. Through these, favourable conditions have been created for establishing or expanding sectors of industry considered indispensable for the economic development of the country. A series of major benefits is granted to industrial projects on the approval of these groups. Specific projects are assessed primarily in relation to the technical organization, the economic productivity and financial characteristics of the operations proposed. Those which satisfy the established standards for granting support and are then approved by the relevant Executive Group enjoy fiscal benefits. Imports which form part of their investment do not require exchange coverage, and loans and guarantees for their payment may be obtained from the official bank agencies responsible for promoting the economic development of the country.

The sectoral agencies are under orders to facilitate the entry into the country of technicians and skilled operatives who come to work in the industries of their concern.

The Committee on Industrial Development (CDI) determines the sectors to be covered by each Executive Group.

/Table 11

Table 11

BRAZIL: VALUE AND PERCENTAGE DISTRIBUTION OF EXPORTS, 1955-1964

Years	Miscellaneous exports		Raw materials		Food products		Chemical and pharmaceutical products		Machines and vehicles		Manufactures		Total	
	Thousands of dollars	Percentage	Thousands of dollars	Percentage	Thousands of dollars	Percentage	Thousands of dollars	Percentage	Thousands of dollars	Percentage	Thousands of dollars	Percentage	Thousands of dollars	Percentage
1955	6 941	0.5	344 779	24.2	1 065 299	74.2	10 363	0.8	2 833	0.2	2 631	0.2	1 423 163	100.0
1956	8 042	0.5	285 635	19.3	1 175 276	79.3	7 916	0.5	1 937	0.1	3 214	0.2	1 482 020	100.0
1957	11 718	0.7	347 784	23.3	1 043 396	75.0	7 446	0.5	1 300	0.1	3 964	0.3	1 391 608	100.0
1958	11 027	0.8	274 376	22.1	945 343	76.0	7 423	0.6	1 791	0.1	3 025	0.2	1 242 985	100.0
1959	11 107	0.8	290 904	22.6	966 791	75.4	8 083	0.6	2 125	0.2	2 959	0.2	1 281 969	100.0
1960	12 792	1.0	296 473	23.4	935 799	73.7	13 377	1.0	1 943	0.2	8 408	0.7	1 268 802	100.0
1961	12 258	0.9	418 905	29.8	933 543	66.5	19 995	1.4	11 257	0.8	7 012	0.5	1 402 970	100.0
1962	2 270	0.2	386 627	31.8	792 189	65.2	14 751	1.2	12 017	1.0	6 331	0.5	1 214 185	100.0
1963	3 604	0.2	397 355	28.2	968 140	68.8	16 605	1.2	10 633	0.8	10 143	0.7	1 406 480	100.0
1964	5 248	0.3	433 781	30.3	920 819	64.4	17 649	1.2	18 266	1.3	34 028	2.3	1 429 791	100.0

Source: Comercio Exterior, 1964, Economic and Financial Statistics Service (SEEF) of the Finance Ministry.

/Table 12

Table 12

BRAZIL: COMPOSITION OF THE VALUE OF PROCESSED EXPORTS, 1955-1964

(Percentages)

Year	Primary commodities	Manufactures and semi-manufactures	Total
1955	98.9	1.1	100
1956	99.1	0.9	100
1957	99.0	1.0	100
1958	98.9	1.1	100
1959	98.8	1.2	100
1960	98.1	1.9	100
1961	97.3	2.7	100
1962	97.2	2.8	100
1963	97.3	2.7	100
1964	95.0	5.0	100

Source: Comercio Exterior, 1964.

/Table 13

Table 13

BRAZIL: VALUE OF MANUFACTURED AND SEMI-MANUFACTURED EXPORTS, 1955-1964

Year	Manufactures and semi-manufactures (thousand dollars)	Index 1955=100
1955	15 227	100.0
1956	13 067	85.8
1957	12 710	83.4
1958	12 239	80.4
1959	13 167	86.5
1960	23 728	155.8
1961	38 264	251.3
1962	33 099	217.4
1963	37 381	245.5
1964	69 943	459.3

Source: Comercio Exterior, 1964.

/Table 14

Table 14

BRAZIL: COMPOSITION OF THE QUANTUM OF PROCESSED EXPORTS, 1955-1964

(Percentages)

Year	Primary commodities	Manufactures and semi-manufactures	Total
1955	99.66	0.34	100.0
1956	99.77	0.23	100.0
1957	99.70	0.30	100.0
1958	99.79	0.21	100.0
1959	99.78	0.22	100.0
1960	98.89	1.11	100.0
1961	99.17	0.83	100.0
1962	99.53	0.47	100.0
1963	99.25	0.75	100.0
1964	97.65	2.35	100.0

Source: Comercio Exterior, 1964.

/6. Private

6. Private initiative in industrial programming

Until the end of 1964 the private sector could only implement government programmes and, through its associations, criticize them, not take any direct part in their formulation. But on 2 February 1965 the Advisory Council on Planning (CONSPLAN) was established, which includes representatives of all different socio-economic categories: workers, entrepreneurs, representatives of information media and members of the liberal professions, and co-operates with the Federal Government in formulating economic policy.

7. The financing of manufacturing industry

The lack of statistical data makes it impossible to give an overall, historical view of the sources and uses of national currency resources used in financing Brazil's industrial development. The conclusions offered below are, therefore, based on partial information providing limited but significant indicators.

Table 15, which shows the sources and uses of the funds of industrial stock companies in 1959, 1961 and 1963, derives from recent work done by the Getulio Vargas Foundation.

There appears from the table to have been a fall during the period in the contributions of new on risk capital and bank, suppliers' and other loans to the total of funds. Appearances to the contrary, these contributions remained relatively stable, as becomes clearer when the values included to cover revaluation of assets, which derive from mere accounting operations and imply no new capital inflows, are eliminated.

There was an obvious drop in the proportion of funds used for new investments and an increase in those used as working capital, especially for inventory financing.

For want of better statistics, it is worth considering the volumes of the BNDE's allocations to the different economic sectors, which, coming from the chief development financing agency of the country, may be taken to be indicators of some significance. Table 16 shows the volumes of these allocations for 1952-1965.

/Table 15

Table 15

BRAZIL: SOURCES AND USES OF FUNDS OF INDUSTRIAL STOCK COMPANIES, 1959, 1961 AND 1963

(Current prices)

	1959		1961		1963	
	10^9 cruzeiros	Percentage	10^9 cruzeiros	Percentage	10^9 cruzeiros	Percentage
I. Sources						
New capital on risk	45	22	50	13	158	12
Bank loans	29	11	39	10	115	9
Other loans (supplies, market)	62	30	164	43	515	40
Reserves	52	25	93	24	311	24
Revaluations	8	4	16	4	140	11
Depreciations	15	7	22	6	57	4
Total	205	100	384	100	1 296	100
II. Uses						
Fixed capital: Revaluations	8	4	16	4	140	11
Fixed capital: New	67	33	94	24	281	21
Available capital	14	7	15	4	75	6
Inventory	39	19	80	21	310	24
Other (realizable)	77	37	179	47	490	38
Total	205	100	384	100	1 296	100

Source: Getulio Vargas Foundation, Journal Conjuntura Econômica, February 1961, 1963 and 1965.

/Table 16

Table 16

BRAZIL: FINANCIAL ASSISTANCE APPROVED BY THE BNDE DURING 1952-1965
BY SECTORS OF ECONOMIC ACTIVITY
(Millions of cruzeiros at 1964 prices)

Years	Total	Sectors of economic activity					
		Transport	Electric power	Basic industries			Agricultural associated and its sectors
				Iron and steel	Others	Sub-total	
1952	47 240.0	47 240.0	-	-	-	-	-
1953	52 602.6	30 602.6	12 820.6	-	8 214.2	8 214.2	964.3
1954	76 837.3	59 230.8	10 405.0	657.9	5 341.0	5 998.9	1 202.6
1955	52 910.2	20 755.1	27 222.4	489.8	3 504.1	3 993.9	938.8
1956	122 417.7	84 186.2	15 742.3	771.9	15 441.4	16 213.3	6 275.9
1957	145 079.8	27 620.3	74 096.8	10 000.0	28 123.7	38 123.7	5 239.0
1958	167 810.5	6 794.9	70 237.9	53 853.3	30 729.5	84 582.8	6 194.9
1959	101 326.6	16 891.2	31 437.7	12 810.9	38 572.8	51 383.7	1 614.0
1960	122 635.6	5 215.3	10 760.6	92 000.0	14 183.1	106 183.1	476.6
1961	135 292.4	1 268.6	85 295.0	35 422.0	8 901.1	44 323.1	4 405.7
1962	71 612.8	-	34 424.8	23 304.1	9 600.0	32 904.1	4 283.9
1963	149 348.3	1 090.9	6 852.3	131 194.9	8 781.8	139 976.7	1 428.4
1964	136 731.9	-	32 609.3	91 831.4	11 496.2	103 327.6	795.0
1965 a/	146 948.1	-	1 748.2	96 977.8	19 028.6	116 006.4	1 160.1

Source: BNDE, Economic Department.

a/ The total here includes other operations such as transfers to regional banks.

It can be seen from the table that in its early years the BNDE helped by preference the infrastructural sectors (transport, electric power, the agricultural sector and the sectors associated with the latter: warehousing, silos, slaughterhouses and meat-packing). More recently, however, it has given preferential treatment to the basic industries, particularly the iron and steel industry which has received lavish resources for the creation of new large-scale plants and the expansion of existing works.

Table 16 does not show the volume of the BNDE's guarantee operations in benefit of enterprises importing machinery, equipment and services for their projects on credit, a matter which will be considered in the chapter on foreign aid to Brazil's development. It may be mentioned, however, that during 1952-1965 the BNDE granted guarantees of this type for a total sum of 865 million dollars.

8. Location of industry

Tables 17 and 18 show the regional distribution of manufacturing industry in terms of certain of its characteristics (number of establishments, average number of operatives and value added), indicating the most important industrial states of each physiographic region. There is a heavy concentration of industry in the states of São Paulo, Guanabara, Rio de Janeiro and Minas Gerais, where manufacturing activity directly employs over 60 per cent of the total number of operatives and contributes over 75 per cent of the industrial value added.

Table 17

Table 17

BRAZIL: CHARACTERISTICS OF MANUFACTURING INDUSTRY BY REGIONS, ACCORDING TO THE INDUSTRIAL CENSUSES

Regions	Number of establishments			Operatives	Monthly average of operatives employed		Value added in million cruzeiros		
	1 January 1940	1 January 1950	1 January 1960	1 September 1940	1949	1959	1939 a/	1949	1959
North (Acre, Amazonas, Rondonia, Para, Amapa)	793	1 212	1 789	10 699	13 699	16 193	85	353	5 025
North-east	4 206	10 683	12 909	90 776	140 229	128 533	639	3 520	26 895
Pernambuco	1 537	3 419	3 556	52 249	70 109	60 532	382	2 139	14 273
Others (Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Alagoas)	2 669	7 264	9 353	38 327	70 120	68 001	257	1 381	12 622
East	13 271	25 389	30 734	226 956	337 540	404 414	2 944	13 916	138 227
Minas Gerais	5 027	10 394	11 960	58 783	87 661	114 815	606	3 195	31 329
Rio de Janeiro	1 877	3 372	4 372	42 230	67 542	92 779	421	3 052	38 642
Guanabara	3 723	4 897	5 302	91 873	134 067	140 689	1 741	6 650	56 247
Others (Sergipe, Espírito Santo, Bahia)	2 644	6 726	9 100	34 070	48 270	56 131	176	1 079	12 009
South	22 200	43 810	60 131	337 940	598 434	913 433	4 024	29 549	362 855
Sao Paulo	12 867	23 074	35 464	254 771	449 084	685 500	2 989	23 280	295 990
Others (Paraná, Santa Catarina, Rio Grande Do Sul)	9 333	20 736	24 667	83 169	149 350	227 933	1 035	6 269	66 865
West-centre (Matto Grosso, Goiás)	513	1 060	2 600	3 232	5 157	11 768	52	246	3 445
Brazil	40 983	82 154	108 163	669 348	1 095 059	1 474 281	7 743	47 584	536 445

Source: Recenseamento Industrial, 1963, general aspects, p. 18. Recenseamento Industrial, 1950, pp. 103, 104.

a/ Includes civil construction, mining and quarrying, and electricity, gas and severage.

/Table 18

Table 18

BRAZIL: SHARE OF THE PRINCIPAL STATES IN THE INDUSTRIAL DEVELOPMENT PROCESS

(Percentages)

States	Operatives employed			Value added		
	1939	1949	1959	1939	1949	1959
São Paulo	38.1	41.0	46.5	38.6	48.9	55.2
Guanabara	13.7	12.2	9.5	22.5	14.0	10.5
Rio de Janeiro	6.3	6.2	6.3	5.4	6.4	7.2
Minas Gerais	8.8	8.0	7.8	7.8	6.6	5.8
Total	66.9	67.4	63.1	74.3	75.9	78.7
Brazil	100.0	100.0	100.0	100.0	100.0	100.0

Source: Instituto Brasileiro de Geografia e Estatística, *Recenseamentos industriales*, 1940, 1950 and 1960.

/IV. POLICY

IV. POLICY MEASURES FOR INDUSTRIAL DEVELOPMENT

1. Government industrial promotion activities

The Brazilian Government can count on a number of different instruments of industrial promotion, including the following:

(a) Law No. 1,474 of 26 February 1951, which authorized the levying of forced loans in the form of an income tax surcharge, in order to create an economic fund for equipment renewal;

(b) Law No. 1,518 of 24 December 1951, which authorized the Executive to contract loans abroad and guarantee foreign loans up to a maximum of 750 million dollars;

(c) Law No. 1,628 of 20 June 1952, which created the National Bank for Economic Development (BNDE), entrusted it with all financial operations relating to the equipment renewal plans, and made it obligatory on insurance companies to contribute to this programme. It further made the BNDE responsible for the administration of the capital thus obtained and for its initial application in the projects proposed by the Brazil-United States Mixed Commission;

(d) In 1953 the exchange régime began to be used to support industrial development, foreign exchange income and reserves having then begun to diminish. To this effect the following provisions have been made:

(i) for the selective entry of foreign investments and loans, under Law No. 1,807 of 7 January 1953 and its regulatory decrees;

(ii) for the classification of products into five categories, for foreign exchange distribution purposes, according to the degree to which they were essential to industrial development, under Instruction No. 70 of 9 October 1953, issued by the Superintendency of Currency and Credit. In the same period it was decreed that the Exchange Department of the Bank of Brazil might sell available foreign exchange by public auction. In view of the strategic position of the external sector this differential exchange régime was of the first importance: it enabled the Government to exercise a selective control of imports by subsidizing those of capital and other basic goods and at the same time to concentrate foreign savings and channel foreign investments into priority aspects of industrial development;

/(iii) for

(iii) for a tariff reform which changed specific into ad valorem rates, under Law No. 3,244 of 14 August 1957. This law also reduced the five above mentioned categories of products to two, one general and one special, with different exchange and tariff rates for each, and created the Council for Customs Policy;

(iv) in 1961, for further modification of the exchange régime, to adapt it to new functions. The exchange subsidies were eliminated, a single exchange rate established and the existing foreign exchange markets reorganized. In brief, the possibility of providing differential treatment through the exchange régime was restricted. These changes in exchange policy were accelerated by Instruction No. 204 of the Superintendency of Currency and Credit, under which both imports and exports became subject to a single exchange rate. This measure was intended mainly to prevent further increases in subsidized imports and at the same time to encourage exports. It also raised the relative prices of equipment and thus expanded the market for the domestic capital goods industry.

A later Instruction - No. 208 - favoured certain regions and products by exempting imports from LAFTA (Latin American Free Trade Association) countries, those of machinery and equipment for setting up new industrial units or supplementing existing ones, and those of production goods with no equivalents produced in the country from the prior deposits established by Instruction No. 204.

The above measures were initiated and implemented by the Superintendency of Currency and Credit. This has since been replaced by the Central Bank, which has the same function of controlling the monetary system and has applied a monetary policy for promoting industrial development in the private sector by means of selective loans for investment essential to economic development, the establishment of different exchange rates, the granting of import licenses without exchange coverage to foreign investments in the country and the fixing of different rediscount rates for commercial banks according to their location (lower in the less developed regions such as the North-East). Through its instructions to the bank institutions, which are legally bound to obey it, it ensures that enterprises really receive the treatment prescribed in the policies established by the authorities.

/2. Customs

2. Customs protection

The Brazilian customs duties régime was altered on 14 August 1957 by Law 3,244. As the regulatory authority for customs matters the same law created the Council for Customs Policy, whose functions are to:

(a) Propose amendments of customs legislation;

(b) Give its opinion on the granting of customs concessions under international agreements;

(c) Assist in the study of any other problems relating to the formulation or application of customs policy;

(d) Make a register of domestic products similar to imported ones and alter it when necessary;[4]

(e) Bring the tariff nomenclature up to date and correct it;

(f) Take other forms of administrative measures.

The Brazilian Law of Customs Tariffs provides for the changing of tariff rates in order to protect certain products when the interests of the economy so demand, viz. the Council for Customs Policy may alter them within limits of 30 per cent above or below their established levels, which range between 0 and 150 per cent. It is thus able to carry out a constant adjustment of tariff rates, taking into account the need both to protect domestic products and to encourage a progressive rise in productivity.

3. Industrial credit policy

To meet their medium- and short-term financial needs industrialists can resort to commercial banks such as the Bank of Brazil S.A. and indirectly to the resources of the Financing Fund for Purchases of Industrial Machines and Equipment (FINAME). The commercial banks operate on an average repayment period of 90 days, except for the Bank of Brasil, whose average period is one year. FINAME grants loans of up to five years duration.

---

[4] The domestically produced articles considered "similar" or "equivalent" to imported articles are included in a register of similar products and enjoy tariff protection.

/With regard

With regard to interest rates the banks must conform to the provisions of the Law on Interest, which allows a maximum rate of 12 per cent a year, and, with regard to periods of loans, to their time deposits. The first of these stipulations, from its incompatibility with the prevailing inflation, created such difficulties for the commercial banks that they were forced to resort to devices for evading the law. The second, from the disappearance of time deposits and the ever more rapid turnover in demand deposits, which considerably diminished the cash funds of the banks, forced them to operate on even shorter repayment periods.

FINAME's resources derive directly from donations and loans made by international, domestic and foreign agencies, among the latter being the Alliance for Progress. Funds are also made available to it by the Bank of Brazil and other federal or state finance agencies and it has access to those mobilized by the BNDE for development purposes in the domestic and foreign capital markets. It derives further resources from the profits on its own operations.

With the development of the capital and durable consumer goods industries there was a notable increase in demand for medium-term loans. The inability of the commercial banks to marshal resources for these loans led to the appearance of loan and finance associations, which use certain legal devices for attracting public resources. A system similar to that of time deposits was thus created as a basis for medium-term loans.

The loan and finance associations operate under regulations established by the Ministry of Finance and in line with the instructions issued by the extinct Superintendency of Currency and Credit, now the Central Bank. Under these regulations they may grant loans repayable in 6 months to two years. In practice, however, they hardly ever allow repayment periods of more than 12 months.

For exports of manufactures industrialists are supported by the Foreign Trade Portfolio (CACEX) of the Bank of Brazil, which provides medium- and long-term refinancing in the following forms:

(a) Operations with a period of not over 360 days from the date of negotiation for the whole of the value of the financing;

/(b) Operations

(b) Operations with a period of over 360 days for the whole value of the part of the financing amortizable within the first 360 days (from the date of negotiation with the Bank) and for 75 per cent of the financing repayable in the remaining period;

CACEX has for these operations:

(a) Resources of its own deriving from loans granted it by the Superintendency of Currency and Credit and the Bank of Brazil, chargeable on the Treasury;

(b) Resources deriving from a credit line for 3 million dollars granted by the Inter-American Development Bank (IDB) to the Brazilian Government.

For long-term financing of fixed assets Brazil relies almost entirely on the invaluable work of the National Bank for Economic Development. Until recently this agency obtained its resources from an income tax surcharge, but in November 1964 this was replaced by a fixed rate of 20 per cent of the receipts from this tax.

Recently the Agricultural and Industrial Loans Portfolio (CREAI) of the Bank of Brazil began to grant long-term loans - initially for financing fixed installations - using resources provided by the International Development Agency.

In addition to the above, there are state and regional agencies which finance industry. Their resources are still limited and many of their operations are carried out with funds transferred from the BNDE.

Lastly, there is the BNDE itself, which has already been described. It constitutes the Government's main finance agency and has the function of providing long-term loans on low interest to finance the creation and expansion of basic activities.

4. Tax policy as a means of promoting and channelling industrial investments

The Brazilian tax system is not yet entirely adapted to the needs of industrial and economic development. However, in spite of its obsolete structure some partial reforms have been carried out, with the result that the income, consumption and import taxes are to some degree functional.

As examples of these functional aspects may be mentioned the fiscal measures favouring the receipt of bonuses in the form of shares, the right of legal persons to invest part of their income tax in enterprises considered of national importance or in the installation of industries in under-developed regions, and the fact that the consumption tax affects only the value added.

Most of these functional aspects have been established with a view to promoting or assisting industry, a sector considered vital to the economic development of the country. The treatment granted to other sectors has been diverse, since the taxes paid by them go almost entirely to the individual states.

It can also be observed that in the Brazilian tax system the laws governing the different taxes tend to form watertight compartments. There is a notable lack of articulation between different kinds of taxes, between federal and state taxes and between the state taxes of the different federal units.

In view of the prevailing inflation and the need to prevent taxation of illusory gains there was established as part of the income tax legislation a revaluation system for the fixed assets of enterprises. These revaluations are carried out in accordance with coefficients published annually by the National Council for Economic Affairs.

In order to encourage investments in renewal and modernization of the industrial inventory, and in view of the need to increase investments in the private sector so as to reanimate the economic development process, Decree 54,298 of 23 September 1964 fixed an accelerated depreciation coefficient on which to calculate the depreciation rates to be deducted from gross profits and thus determine the real profits subject to income tax. The accelerated depreciation percentages are calculated on the purchase costs of the depreciable goods.

On 16 July 1964 Law 4,357 laid down the principles of the Emergency Tax Reform recommended in the Government Action Programme. Its article 27 provides that, on calculating the additional tax on incomes in relation to the capital of legal persons, the amount corresponding to the maintenance of the person's owned working capital during the base year for the declaration should be deducted from the excess profits subject to this tax.

The amount of this maintenance is determined by applying to the enterprise's owned working capital as of the beginning of the financial year, the monetary readjustment percentages periodically published by the National Council for Economic Affairs, which are based on the rise in the general price level during the base year.

Tax exemptions have for the most part favoured the under-developed regions, such as the Amazon region and the North-East, which fall within the spheres of action of the Superintendency of the Plan for the Economic Exploitation of the Amazon (SPVEA) and the Superintendency for the Development of the North-East (SUDENE). A number of tax exemptions have been granted to industrial sectors which it is desired to stimulate, almost all related to the income tax.

Subsidies have been granted almost exclusively to the transport sector, part of whose deficit has been covered with Government financial resources. The subsidies of most importance for industrial development policy were the monetary subsidies granted by means of the multiple exchange rates.

The responsible Federal Government agencies are studying the further alterations that should be made in the Brazilian tax system in order to speed up the economic growth rate, whether by increasing capacity to mobilize resources for purposes of promoting larger investments or by redistributing income in such a way as to encourage more dynamic activity on the part of the forces of production and consumption.

5. The legal régime governing foreign enterprises and capital

The provisions governing the entry of foreign capital in the form of direct investments or loans is contained in Law 4,131 of 3 September 1962, amended by Law 4,390 of 29 August 1964, and in Decree No. 55,762 of 17 February 1965 regulating the application of the former. It may also be remarked that the legal treatment of foreign capital invested in the country is the same as that of domestic capital.

Foreign capital is understood to be goods, machinery and equipment entering the country without initial expenditure of foreign exchange and destined for the production of goods or services, and also financial or monetary resources entering the country in order to be used in economic activities and belonging to natural or juridical persons resident, domiciled or established abroad.

Foreign capital, whatever the manner of its interment, must be registered with the Central Bank, under the regulations laid down by the latter. A similar registration is required for remittances abroad of foreign capital previously invested, earnings on such capital, profits, dividends, interest, amortizations, payments for industrial licenses or technical assistance, or any other involving transfer of earnings abroad; as also for reinvestments of profits from foreign capital; for alterations in the monetary value of the capital of foreign enterprises, in accordance with the standing legislation; and for foreign capital with its respective reinvestments already existing in the country on 27 September 1962.

Foreign capital as such is registered in the foreign currency in which it entered; when in the form of financed imports it is registered in that of the domicile of the creditor; and when it consists of investments in the form of goods it is registered in the currency of the home country of the investor. In the latter two cases its value is taken to be the price given in the commercial invoice. When this does not include freight and insurance costs the f.o.b. value is used.

Registration of foreign investments must take place within 30 days of their entry into the country, independently of payment of dues or fees.

The Central Bank can authorize the conversion into investments of the capital of registered loans and of interest which might be remitted abroad. It can also authorize the registration of interest on loans, profits on capital and any other sum which might be sent abroad in the form of loans with definite periods and interest rates.

The National Monetary Council can lay down special conditions for transfers which will be compensated by the entry of new resources of at least equivalent value for use as working capital or in the purchase of equipment produced in the country.

Purchases made abroad by enterprises whose assets are mostly in Brazil, remittances abroad of author's earnings and royalties gained in the country, and the transfer from the country of the estates of persons taking up residence abroad all require the permission of the Central Bank.

The Treasury and the official public loan agencies of the union and the states, as also the mixed corporations controlled by them, need the authorization of the Executive, granted by decree, to guarantee foreign loans to enterprises in which the share capital giving voting rights belongs in its greater part to natural or legal persons resident, domiciled or established abroad. These enterprises may only have access to public credit on proof of having begun their operations, and may only receive benefits with regard to new investments and fixed assets if their activities are essential to the economic development of the country and take place in regions declared of national importance by decree of the Executive.

The above considerations do not take into account the resources which foreign enterprises may receive from the public loan agencies out of funds made available to the latter by international credit organizations or agencies. The exchange risk of these operations will be taken by the enterprise benefited in cases where it does not fall on the original lender.

Foreign reinvestments are understood as earnings of enterprises established in the country and belonging to persons resident or domiciled abroad, which are invested in the same enterprises or in some other sector of the Brazilian economy. The registration of such reinvestments is obligatory even when they are made by legal persons established in Brazil if these latter are affiliated to foreign enterprises or their majority interest belongs to natural or legal persons resident or established abroad. This registration must be carried out within thirty days of the approval of the respective accounting entry. The reinvestments are registered simultaneously in national currency and in that of the country to which the sum would have been remitted; the conversion is made on the basis of the average exchange rate obtaining between the date on which the profits are realized and that on which the reinvestment comes into effect; the calculation is based on the quotations of the exchange market through which the reinvested profits would have been transferred abroad.

/To make

To make remitments abroad enterprises must be registered with the Central Bank, in proof of which they must show a registration they can prove, a certificate as well as a receipt for the payment of the income tax to which the remitment is liable. In practice there are no restrictions on the remittance of liquid profits and dividends abroad except only on that of profits and dividends from foreign capital invested in the production of luxury goods and services; such remitments may not exceed 8 per cent a year on the capital registered with the Central Bank; if the situation of the country requires it this percentage can be lowered to 5. When the remittance is above 8 per cent the sum remitted is considered as return of capital and is, therefore, deducted from the registered sum on which future remitments will be calculated. It may, however, instead be invested in the same enterprise or in regions or sectors considered by the Federal Government to be of priority. Finally, liquid profits and dividends effectively sent abroad are subject to a supplementary income tax when the average of the remittance made in a triennium (starting from 1963) is over 12 per cent of the capital and reinvestments registered.

Remitments of interest on loans, credits, and financing are considered as amortization of their capital to the extent to which they exceed the interest rate established in the respective contract and declared in the register; and any part of the interest rate in excess of the rate for similar operations in the financial market from which the loans, credits or financing derive obtaining on the date on which they become effective may be declared illegal by the Central Bank.

Applications for the registration of contracts for making financial transfers in connexion with the payment of licenses to use patents, industrial or commercial trade marks and similar titles must be accompanied by a certificate proving the existence and legality in Brazil of the respective privileges as granted by the Department of Industrial Property and by a document certifying that these privileges have not lapsed in the country of origin. These registrations are made in the currency of the country of domicile or establishment of the beneficiaries of the remittances.

/Sums owed

Sums owed for industrial licenses may be deducted in income declarations within a limit of 5 per cent of the gross income from the product manufactured or sold, when determining taxable earnings; to this end, the Ministry of Finance establishes and periodically publishes co-efficients for each branch and type of productive activity. Remitments exceeding the limits provided for are considered as profits and are subject to the corresponding taxes. Remitments in payment of industrial licenses from affiliate or subsidiary enterprises established in Brazil to their principals abroad are prohibited, as also when most of the capital of a Brazilian enterprise belongs to foreign persons owning the industrial licenses concerned.

In fractions of Law 4,131 and its amendments in Law 4,390 are liable not only to the specific penalties established in their texts, but also to fines of 20 to 50 times the largest minimum age obtaining in Brazil, appeals to the Monetary Council being allowed in these cases.

False statements in the declaration of financial transfers are liable to fines of up to 100 per cent of the value of the transaction and of false identity to fines of three times this value. Customs or exchange frauds by means of additions or reductions in invoices of exports or imports of goods and merchandise are investigated by standard administrative inquiry in which the accused has a right of full defense; the Monetary Council can apply to parties guilty of such frauds a fine of ten times the amount of the fictitious addition or reduction in the invoice or prohibit them from exporting or importing for a period of one to five years.

If the balance of payments shows serious deficits the National Monetary Council can restrict imports and remittances of profits abroad. In this event remittances of capital are prohibited altogether and those of profits are limited to a maximum of 10 per cent a year, in accordance with the co-efficients fixed by the Monetary Council. The Council can also restrict remittances of payments for industrial licenses and similar items to a maximum of 5 per cent a year cumulative on the gross income of the enterprise. Moreover, these remittances are subject to a tax of a strictly monetary character, which may be as high as 50 per cent (at present this tax is 10 per cent).

/6. Promotion

6. Promotion policy for exports of manufactures

(a) Income tax (Law 4,663 of 3 June 1965)

This law allows enterprises to deduct from their taxable profits for the financial years 1966, 1967 and 1968 that part which corresponds to exports of manufactures. This part is to be calculated on the basis of the percentage share of exported products in the total sales of the enterprise. This law also stipulates that for these purposes sales of manufactured products in the domestic market paid for in convertible foreign exchange provided on long-term by international finance or foreign government agencies will receive the same treatment as exports.

(b) Consumption tax (Law 4,502 of February 1964)

This law exported products from the consumption tax. When the producer himself exports his merchandise he is compensated for the amount of the tax on raw materials and intermediate products effectively used in the industrial process either through the credit system or, when this is not possible, by direct refund.

(c) Sales and consignments tax

As an addition to the incentives programme for exports of manufactures initiated by the Federal Government some states have taken measures to reduce or eliminate the state taxes falling on these products:

(i) State of São Paulo (State Law 8,234 of 17 July 1964). This law grants exporters a bonus equivalent to the amount of the sales and consignments tax levied on the sale of the exported manufactures. Manufactures are understood as those products which have passed through an industrial transforming process and are included in the list established by the Council for Exports of Industrial Products, which was created for this purpose and functions as part of the Finance Secretariat.

(ii) State of Minas Gerais (State Law 3,214 of 16 October 1964). This law abolished the export tax and granted exporters of manufactures established in Minas Gerais a bonus equivalent to the total value of the incidence of the sales and consignments tax on merchandise delivered abroad. For these purposes manufactured products are understood as those which have undergone some industrial transforming process and are included in the list of the Standing Committee on Exports of Manufactured Products of the Finance Secretariat.

(iii) State of Rio Grande do Sul (State Law 4,827 of 1 December 1964). This law exempts manufactures made in the state and delivered directly abroad from the sales and consignments tax, listing the products that may for these purposes be considered manufactures.

(iv) State of Guanabara (State Law 672 of 19 December 1964 and Decree 343 of 29 December 1964). Law 672, which establishes a stamp tax on exported merchandise, and its regulatory decree - Decree "N" N° 343 -, stipulate that the stamp tax on merchandise exported outside Brasilian territory will be 1 per cent of the export value. Combined with the additional rate referred to in Decree "N" N° 332 of 17 December 1964, this came to a total tax on foreign sales of 1.08 per cent for the financial year 1965, as against the 5.4 per cent levied prior to the law.

(v) State of Pernambuco (State Law 5,579 of 22 June 1965). This law exempts from state taxes exports of manufactures made through the State which are permanently included in a list prepared by the Development Council, an organ of the Pernambuco Economic Development Commission (CONEPE).

(d) Other taxes

By an internal decision of the Foreign Trade Portfolio, persons taking out licenses for imports connected with exports of a promotional nature and for products on consignment are exempt from payment of the fees referred to in Decree 42,820 of 16 December 1957 (article 97). Law 4,505 of 30 November 1964 exempts exchange operations relating to exports of manufactured products from the stamp tax.

(e) Draw-back provisions

Draw-back operations are governed by:

(i) Article 37 of Law 3,244 of 14 August 1957;
(ii) Decree 53,967 of 16 June 1964;
(iii) Instruction 7 of the Council for Customs Policy, of 29 October 1964;
(iv) Foreign Trade Portfolio Communiqué 153 of 14 September 1964;
(v) Instruction 279 of the Superintendency of Currency and Credit of 10 September 1964.

/Draw-backs

Draw-backs - that is, total or partial exemption from import tax of merchandise used in manufacturing export products - are applied to:

- raw materials and semi-manufactures used directly in the manufacture of merchandise destined for export;
- parts, utensils, devices, apparatus and machinery which complement apparatus, machinery, vehicles and equipment destined for export;
- merchandise or materials used in the packing, final preparation or presentation of products destined for export;
- merchandise imported for processing in the country and subsequent re-export;
- parts, utensils, devices, apparatus and machinery for repairing, reconditioning or rebuilding machinery and equipment, boats vehicles and aircraft temporarily admitted to the country and consigned to repair or maintenance docks or workshops.

The Council for Customs Policy, which, together with the Foreign Trade Portfolio of the Bank of Brazil and the Customs Revenue Department, is responsible for these matters, has granted total exemption from import tax in draw-back operations. However, when the products are imported for use as industrial inputs in goods for both export and domestic consumption the draw-back covers only the part of the imported product used in the exported goods.

All imports for use in manufactured exports are further exempt from the compulsory prior deposit (50 per cent of the contracted payment in foreign exchange, repayable within 30 days in 180 day bills of the Bank of Brazil) and from the finance tax (10 per cent of the value of the contract in foreign exchange).[5] Moreover, the Foreign Exchange Portfolio of the Bank of Brazil is authorized to dispense enterprises from purchase of the certificate of exchange coverage for them.

(f) Other export incentives

For the further stimulation of exports the Federal Government has supplemented these measures by provisions relating to exchange and financing and of an administrative nature, among the chief of which are:

---

[5] A recent resolution of the Central Bank abolished both the compulsory deposit and the finance tax.

(i) Those designed to keep the exchange rate adjusted to reality;

(ii) That authorizing enterprises exporting products of their own manufacture to draw special foreign exchange quotas in order to import raw materials, parts and pieces without equivalents in the country (according to the general classification) for use in manufacturing, preparing or finishing their products. These quotas are only granted when the enterprise concerned can give proofs to the Foreign Exchange Portfolio of the Bank of Brazil of the liquidation of the corresponding contracts in foreign exchange and cannot exceed 50 per cent of the foreign exchange earned by the exports.[6] The same provisions are made for imports of machinery and equipment, considered in the general classification to be without national equivalents, for use in such enterprises' own industries, and for payments of financial liabilities contracted abroad.

(iii) Instruction 278 of 10 September 1964, which stipulates that transactions involving periods of not more than 360 days, counting from the date of their negotiation with the Bank of Brazil, may be refinanced for the whole of the financed part up to a limit of 80 per cent of the whole value of the transaction. For transactions of over 360 days duration the Foreign Trade Portfolio will refinance the whole of the financed part amortizable within 360 days, and 75 per cent of the rest of the financing. If the demand payment is higher than the required 20 per cent the refinancing of the part repayable after 360 days can exceed 75 per cent of this remainder. These provisions have made refinancing of foreign exchange deriving from financed exports of capital and durable consumer goods paid for in hard currency much more flexible.

(iv) Decree 54,105, which created the Fund for the Democratization of Enterprises' Capital to provide working capital to industrial enterprises of the country, with priority for activities producing export goods.

---

[6] Instruction 279 of 10 October 1964. Enterprises complying with Interministerial Regulation 71 of 21 February 1965 have the limit raised to 100 per cent.

(v) Decree 53,982, which gives preference to imports of crude petroleum and petroleum products which, without detriment to competitive prices, envisage and make possible a resulting export of Brazilian manufactures selected by the Foreign Trade Commission.

(vi) Instruction 284, which instituted as a foreign trade norm the export on consignment of Brazilian manufactures included in classes 6, 7 and 8 of the Brussels Nomenclature and others specified by the Foreign Trade Portfolio.

(vii) Law 4,678 of 16 June 1965 on the securing of loans for exports, which is designed to protect exports of goods and services on credit from trade, political and extraordinary risks.

7. Provisions for small-scale industry

In May 1965 the regulations governing operations with the resources of the Assistance Loan for the Small- and Medium-Scale Enterprise came into force. This loan for a sum of 27 million dollars, had been subscribed by the BNDE and IDB, and with its resources the BNDE was to finance, directly or through other credit institutions, investments in domestic or foreign (imported) fixed assets destined for the installation or expansion of small- or medium-scale enterprises. It was also to finance the technical services needed for preparing projects and for raising the productivity of the enterprises benefited.

For the administration of these funds FIPEME - the executive group for the Financing Programme for the Small- and Medium-Scale Enterprises - was created, and made responsible for determining the sectors of most importance for the promotion of the regional economies, the formation of the domestic product, the supply of subsistence goods, the complementation of industrial sectors already existing in Brazil, the continuity of the economic development process, the expansion or maintenance of domestic demand with a view to the increase or better use of installed capacity in production goods factories, and the promotion of exports.

For these purposes, and for the information of interested parties, the group prepares a six-monthly report on the sectors concerned.

/The order

The order of priority for each sector is fixed in accordance with the principles applied by the BNDE and with the peculiarities of the regional economies, taking into account also the rapidity with which the loans will be used and their effects on the respective operations.

The interest on these loans is 8 per cent a year plus a 0.5 per cent administration commission; these rates are calculated on the balances owed. A rate of 1 per cent is charged on the total value of the loan as a starting commission. The interest charged on funds transferred to loan agencies is 6 per cent. The maximum duration of the loans, including the initial payment-free period, is four years.

The IDB resources lent by the BNDE for these purposes must not exceed 50 per cent of the overall amount of the investments. Up to 5 per cent of the IDB loans may be used to finance the preparation of projects and the provision of technical assistance, as long as the BNDE or the intermediary credit agencies devote an equal sum to the same purpose.

The Bank of Brazil assists medium- and small-scale enterprises through its Agricultural and Industrial Loans Portfolio, which uses resources obtained under agreements with the International Development Agency (IDA).

8. Direct state promotion through public or mixed enterprises

The State has played a dominant part in the evolution of the Brazilian economy, particularly as regards the basic infrastructural services and the industrial sector.

The development process in Brazil was hindered from getting fully under way by a number of fundamental problems, including:

(a) the insufficient development of the private capital market;

(b) the need to activate basic sectors in a short period.

Moreover, some of the sectors to be developed have such a high capital-product ratio as to require very lavish national and foreign currency resources in order to be established on an economically viable scale. Since also their rate of return was low and the periods of maturation of their investments comparatively long there was still less prospect that they would attract any considerable quantity of private capital.

/This situation

This situation occurred most typically with regard to the infrastructural services such as transport and energy, in which the State made huge direct investments to meet the needs of development. For similar reasons it has made and continues to make large investments in the industrial sector via enterprises in which it holds a majority interest.

Among the chief state industrial enterprises are the following:

(a) Brazilian Petroleum Corporation (PETROBRAS)

PETROBRAS was founded in 1954 by Law 2,004 which established a state petroleum monopoly (on prospection, production, refining and transport) throughout Brazilian territory, and has operated on such a scale as to enable almost all the petroleum consumed in the country to be refined there and considerable progress to be made in the production of crude petroleum. It recently discovered two new petroleum fields of considerable size in the North-East, that of Carmópolis (State of Sergipe) and that of Barreirinhas (State of Maranhão). Taking into account petroleum domestic consumption estimates for the near future, the exploitation of these fields should enable imports of crude petroleum to be eliminated within 7 or 8 years.

During the first four months of 1966 PETROBRAS' production reached a daily average of 17,000 cubic metres (107,100 barrels), and in the same period the drilling of 116 wells, representing 130,288 metres drilled, was completed. Natural gas production amounted to 96.3 million cubic metres, while the natural gasoline plant produced 8,984 cubic metres of liquid natural gas.

As regards petrochemicals, PETROBRAS is programming the implementation of projects for the production of fertilizers and nitrogenous products, aromatic products, olefines, anti-knock liquids, latex and synthetic rubber, acrylonitrile, etc., with an estimated total investment of 150 million dollars.

(b) Vale do Rio Doce Company (CVRD)

The CVRD mines iron ore in the State of Minas Gerais and has an extraction capacity of approximately 20 million tons a year. Most of its ore production is exported.

/It is

It is the fifth largest ore exporting enterprise in the world. It has on hand an expansion plan for integrating its mines with rail and sea transport installations and installing Brazil's first pelletization plant, the project for which was prepared in 1963. The plan will involve an investment of 120 million dollars by 1968. 30 million of these will be financed from foreign loans and the rest from the resources of the enterprise.

The reasons for the rapid execution of this plan are, among others, the need to fulfil the export contract signed with the Japanese steel industry, which will give Brazil an income of 500 million dollars in the next fifteen years, that of increasing the penetration of the European markets by Brazilian ores and that of adapting the rail and sea transport installations to technological advances.

In 1965 the Company's iron ore exports amounted to 10 million tons, giving a foreign exchange income of 82 million dollars.

The deficiencies of the existing port facilities prevented more than 7 million tons a year from being exported through them, in view of which the Company has undertaken the construction of a port at Tubarão in the State of Espírito Santo, which will be one of the largest and best equipped specialized ports in the world and will soon enable over 20 million tons to be exported annually.

The Company is also studying the installation of an iron-ore pellet plant with a view to supplying foreign markets.

(c) Special Steels Company Itabira S.A. (ACESITA)

ACESITA is a stock company whose chief shareholder is the Bank of Brazil, which owns over 90 per cent of its share capital. It produced special steels (carbon steels, steel alloys, silicon steels).

(d) National Steel Company (CSN)

The National Steel Company is a stock company whose majority shareholder is the Federal Government and which is in the forefront of common steel production in Brazil. Its present production capacity is 1,400,000 tons a year of ingots, which it is planning to raise to 2,500,000 tons.

This expansion is to be implemented in two stages, is to involve increases in the installed capacity of several sections of plant, and will require an investment of 22.2 million cruzeiros and 16.5 million dollars. The BNDE has offered to guarantee loans to a value of 8.5 million dollars. It is estimated that it will be completed at the end of 1968.

(e) Steel Company of São Paulo (COSIPA)

COSIPA first entered into operation in December 1963. Its initial production capacity is 500,000 tons a year of steel ingots. Its chief shareholder is the BNDE which financed most of the investment needed. Its production will in future be raised to about 2 million tons of steel a year.

COSIPA's plant is located in Cubayao (piacaguera) and was inaugurated in December 1963, when its rolling mill began production using ingots from the National Steel Company and from the Minas Gerais Steelworks. The cold-rolling mill began production at the beginning of 1965.

(f) Minas Gerais Steel works (USIMINAS)

This works has been entering into production stage by stage since the end of 1962. Its initial production capacity is about 500,000 tons a year of steel ingots. It was financed with Brazilian and Japanese capital, its chief shareholder being the BNDE; future expansions of the works up to an estimated capacity of 2 million tons a year of ingots are envisaged.

(g) Iron and Steel Company of Vitoria (CFA)

At present this enterprise, which is located in Cariacica, only rolls ingots which it receives from other steel enterprises. Its steel mill should be finished in 1970 and is to have a capacity of 500,000 tons a year of ingots. Its final production capacity is envisaged at 1 million tons a year. The chief shareholder and financer of this enterprise is again the BNDE.

(h) National Motors Factory (FNM)

This is one of the major motor vehicle manufacturing enterprises in Brazil. It produces heavy lorries and motor cars. It has received considerable financial assistance from the BNDE and direct resources from the Treasury.

Under a present project the enterprise envisages an expansion of its industrial installations in order to increase its production and achieve a higher integration index for domestic lorry parts, as also for its manufacture of A.R. 2,000 motor cars. It is hoped to attain a production of 20 lorries a day, mainly of the D-11,000 type, begin manufacture of 150 HP AR 1,610 diesel motors for lorries, and produce 40 passenger cars a day, including their motors.

(i) National Alkalis Company (CNA)

This is the only producer of sodium carbonate in Brasil, its production capacity being roughly 1,000 tons a year. Most of its shares belong to the Federal Government and it has received large resources for financing its investments from the BNDE.

9. Regional industrial development policy

In order to reduce the inequalities between the different regions of the country, a number of measures were included in the Government Economic Action Programme among which were the establishment of fiscal incentives for private investment and the allocation of government resources to the less developed areas.

Thus, the Federal Government Public Investments Programme for 1965 allocated 47 per cent of the programmed sum to regions outside the States of São Paulo, Guanabara, Rio de Janeiro and Minas Gerais, in spite of the fact that the beneficiary states provide only 17 per cent of the tax income of the Union.

Measures to reduce regional disparities have been carried out for some time; one of the most important of them was the creation of the Superintendency for the Development of the North-East (SUDENE) in December 1959. To carry out its tasks this agency has resources of no less than 2 per cent of the tax revenue of the Union, calculated on the basis of the most recent collection; at the same time its legal structure gives it a large degree of financial autonomy. In addition, the income tax legislation allows legal persons to invest 50 per cent of the taxes owed by them in enterprises recommended by SUDENE. As a counterpart the States falling within SUDENE's jurisdiction grant tax incentives to the industries installed in their territories. These incentives are governed by different principles in each state and are of different duration. A further important instrument of this policy is the Bank of North-East Brazil, which operates in the same area as SUDENE and finances investments tending to raise the income and employment levels in that area. Law 1,806 of January 1954 created the Superintendency of the plan for the Economic Exploitation of the Amazon (SPVEA); under its statutory provisions this agency receives 3 per cent of the tax revenue which it uses, among other purposes, to further the processing of raw materials produced in the region.

In other regions the excellent results obtained by the BNDE at the federal level led to the foundation of state industrial development banks and to the creation and putting into operation of public, regional or state agencies for evaluating and solving the problems of their respective jurisdictions.

(a) Agencies concerned with regional development

On account of its continental size Brazil has regions which are at different stages of economic and social development and register different growth rates. The need to eliminate or reduce regional disparities has led the federal, inter-state and state administrations to create agencies with the specific task of solving this problem.

The chief federal and inter-state agencies concerned with regional development are:

Superintendency of the Plan for the Economic Exploitation of the Amazon (SPVEA)

SPVEA was created by Law 1,806 of 6 January, 1953 and regulated by Decrees 34,132 of 9 October 1953, 51,731 of 21 February 1963 and 52,149 of 25 June 1963. Its task is to prepare a plan for the economic exploitation of the Amazon (promotion and development of agricultural production, exploitation of mineral resources and improvement of the bank credit system; formulation of a demographic policy; energy generation; promotion of livesto production and of commercial relations with the consumer and supplier markets application of a programme for research into geographic, natural technologic and social factors of the region and into incentives for attracting private capital to it).

Its sphere of action is the northern region of Brazil (States of Amazonas, Pará, Acre and its territories), a large part of the State of Maranhão and the northern part of the States of Mato Grosso and Goiás, representing in all 59.4 per cent of Brazil's surface.

Superintendency for the Development of the North-East (SUDENE)

SUDENE was created by Law 3,692 of 15 December 1959 and regulated by Decree 47,890 of 9 March 1960, and has the tasks of studying and proposing guidelines for the development of the North-East; supervising, co-ordinating and controlling projects prepared and implemented in the region by federal agencies which are specifically related to the region's development; implementing directly or by agreement, covenant or contract development projects for the North-East which are assigned to it by the existing legislation; co-ordinating national or foreign technical assistance programmes in benefit of the North-East.

SUDENE's sphere of action is the whole of the North-East region (States of Maranhão, Piauí, Ceará, Rio Grande do Norte, Pernambuco, Paraíba, Alagoas, Sergipe, Bahia) and that part of the State of Minas Gerais which falls within the so-called Polígono Da Seca (Region of Droughts).

National Department of Works for Counteracting Droughts (DNOCS)

This was first created in 1909 under the name of Federal Inspectorate of Works for Counteracting Droughts (IFOCS) and changed the present DNOCS by Laws 1,348 of 10 February 1951 and 4,229 of 1 June 1963 and Decrees 20,284 of 28 December 1945. The main task of this department is to combat the effects of the periodical droughts which afflict North-East Brazil. Its main activities are the building of dams, highroads and irrigation canals and the installation of electric power networks and water supply systems. Although it operates mainly in the North-East (Polígono Da Seca), its work is not confined to this.

São Francisco Valley Commission (CVSF)

This body was created as a result of the wish of the federal authorities to regulate the basin of the São Francisco River, the third most important of the country, in order to allow the economic exploitation of a vast surrounding region (States of Minas Gerais, Bahia, Pernambuco, Alagoas and Sergipe).

Although its 1946 constitution provided for its institution, assigned it resources and fixed its jurisdiction, the Commission only began to function in 1950. After making studies on the regulation of the volume of the rivers crossing the region, on its human resources and other related matters, the Commission prepared its first general plan, directed towards the solution of problems of electric power, transport, irrigation, drainage, health, cultural development, etc.

The most important of CVSF's achievements has been the Tres Marias dam, built essentially in order to control the São Francisco River. However, the completion of this dam has given raise to many other benefits such as flood control, large-scale irrigation and electric power generation. The regulation of the volume of the São Francisco River will make it navigable between Irapora in the State of Minas Gerais and Juazeiro in the State of Bahia, (1,370 kms). CVSF is governed by Laws 541 and 2,599 of 15 December 1948 and 13 September 1955 respectively and regulated by Decrees 29,807, 38,969, 40,165/6 and 42,335 of 25 July 1951, 4 April 1956, 18 October 1956 and 26 September 1957, respectively.

Superintendency of the Plan for the Exploitation of the South-West Frontier Region of the Country (SPVERFSP)

SPVERFSP was created by Law 296 of 28 November 1956 and regulated by Decree 47,625 of 15 January 1960. Its main task is to raise the standard of living of the population of this region and integrate it into the national economy through activities relating to education, culture, health, land improvement, production increase, extension of communications, supply facilities, industrialisation, electrification, research, and exploration in general.

The Plan for the Economic Exploitation of the South-West Frontier Region of the Country will be in force for 20 years in the form of four five-year programmes and will systematically promote such measures, services, works and activities of the different departments of the Federal Government in benefit of the region as fall within the jurisdiction of the Union and do not encroach on the authority of the state and municipal administrations, as defined by the Constitution. SPVERFSP's headquarters are in Porto Alegre in the State of Rio Grande do Sul and it operates in many municipalities in this state and in Santa Catarina, Paraná and Mato Grosso.

Development Commission for the West-Centre (CODECO)

CODECO was created by Decree 1,6741 of 7 June 1961, but has not yet begun to function. The tasks assigned it are as follows: to make a provisional diagnosis of the situation of the region; prepare and submit to the President of the Republic the necessary background information for a bill for creating a superintendency for the development of the West-Centre; formulate guidelines for a development policy for the region on the basis of technical work of the Executive Secretariat; propose to the President of the Republic, the ministers of state and the directors of the non-ministerial agencies subordinate to the Presidency of the Republic measures for facilitating or accelerating the implementation of programmes, projects and works, including those already begun, and establish the regulations to govern such implementation; advise on the preparation and implementation of Federal Government projects for the region; decide the destination of the financial resources placed at its disposal. CODECO's field of action is the States of Mato Grosso and Goiás.

Development Council for the Far South (CODESUL)

CODESUL was created on the initiative of the governments of Paraná, Santa Catarina and Rio Grande do Sul and operates in close collaboration with the Regional Development Bank for the Far South (BRDE) in drawing up general guidelines for the economic policy and programming of the region. The Governments of the member states appoint the present of this Council in rotation, for one year each.

Credit Bank for the Amazon (BCA)

The present BCA was initially the Credit Bank for Rubber S.A., which served not only the region but the productive activity which was its economic basis. BCA has been made responsible for carrying out bank transactions relating directly or indirectly to the industrial, commercial and productive activities of the Amazon region and to rubber trading and processing activities throughout Brasilian territory. It is governed by Law 1,184 of 30 August 1950 and Decrees 4,451 of 9 July 1942 and 4,841 of 17 October 1942 and operates over the same region as SPVEA. In addition to its own capital and its reserves, BCA receives 0.003 per cent of the tax revenue of the Union, which sum goes to form its Fund for the Promotion of Production.

/Bank of

Bank of North-East Brasil (BNB)

BNB is more than an ordinary credit agency since it is concerned with development promotion in the North-East region. It was created on 19 July 1952 under approval of Law 1,649 which assigned it as its chief task that of granting loans to productive enterprises in the Polígono Da Seca. The law stipulated the following uses for its loans and financing: purchase and construction of silos and storehouses on farms; purchase or modification of agricultural or industrial equipment and machinery purchase of stud and work animals; electric power generation; financing of harvests, preferably through agricultural co-operatives; financing on security of goods of products of the region up to a maximum of 80 per cent of their trade value or of their official minimum price; construction and installation of warehouses in the collection and distribution centres and of plants for preparing and processing products of the region, when such works contribute to the development and stability of agricultural production; the development and creation in the Polígono Da Seca of industries using local raw materials which give a more productive employment to the population or which are necessary for raising its essential consumption level (artesan and cottage industries are included).

Regional Development Bank for the Far South (BRDE)

BRDE - an autonomous inter-state economic agency - was founded on the initiative of the governments of the States of Rio Grande do Sul, Paraná and Santa Catarina on 21 December 1961. Its basic purpose is to promote the development of the far south in accordance with the general guidelines drawn up by CODESUL. BRDE co-operates with the Council in the economic programming of the region, the systematization of regional economic policy, the study of measures to be adopted and the analysis of trends in the economic situation. The Bank's resources consist of its capital, the profits on its transactions, 1 per cent of the tax revenue of the member states and the Fund for Livestock Investment (Law 4,683).

Other agencies

In addition to the above the following agencies may be mentioned: the Committee on Territorial Affairs (CAT), the National Institute for Amazonic Research (INPA), the Amazon Navigation and Pará Port Administration

Service (SNAPP), the Inter-state Committe for the Araguaia and Tocantins Valleys (CIVAT) and the Inter-state Committee for the Paraná-Uruguay Basin (CIPPU).

Neither the Federal Government nor the States became actively concerned over regional development until the fifties, but since that time many regional and state development agencies have arisen, including the following state advisory, planning and information organizations.

- State of Amazonas: Economic Development Commission for the State of Amazonas (CODEAMA)
- State of Pará: Development Council for Pará (CONDEPA)
- State of Maranhão: Economic Planning Commission for Maranhão (COPEMA)
- State of Piauí: Economic Development Commission for Piauí (CODESE)
- State of Ceará: Superintendency of Economic Development and Culture (SUDEC)
- State of Rio Grande do Norte: State Development Commission (CED); Advisory Board on Planning, Co-ordination and Control of the State (APPC)
- State of Paraiba: State Council on Development (CED)
- State of Pernambuco: Economic Development Commission for Pernambuco (CODEPE)
- State of Alagoas: Economic Development Company of Alagoas (CODEAL)
- State of Sergipe: Economic Development Council for Sergipe (CONDESE)
- State of Bahia: Economic Planning Commission (CPE); Industrial Development Council (CDI)
- State of Espíritu Santo: Planning Secretariat
- State of Rio de Janeiro: Economic Development Porfolio of the State (CADEC); Central Committee on Planning and Co-ordination (CEPLAN)
- State of Minas Gerais: Development Secretariat
- State of Guanabara: Secretariat for Economic Affairs
- State of São Paulo: State Planning Service (SEP)
- State of Santa Catarina: Co-ordinating Office for State Target Plans (PLAMEG)
- State of Rio Grande do Sul: State Development Council (CDE)
- State of Mato Grosso: State Planning Council (PLAMAT)
- State of Goiás: Planning and Co-ordination Secretariat of Goiás.

The following are the state credit agencies:

- State of Amazonas: Bank of the State of Amazonas (BEA)
- State of Pará: Bank of the State of Pará (BEP); Mixed Company for the Progress of Pará (PROPASA)
- State of Maranhão: Bank of the State of Maranhão; Development Fund for Maranhão (DEMAR)
- State of Pianí: Trade and Agricultural Bank of Pianí
- State of Ceará: Bank of the State of Ceará; Economic Development Company of Ceará (CODEC)
- State of Rio Grande do Norte: Bank of Rio Grande do Norte S.A.
- State of Paraiba: Bank of the State of Paraiba; Agricultural and Industrial Development Fund (FRAGRIN)
- State of Pernambuco: Development Bank of the State of Pernambuco
- State of Alagoas: Bank of Production of Alagoas Economic Development Company of Alagoas (CODEAL)
- State of Sergipe: Economic Development Bank of Sergipe
- State of Bahia: Economic Development Bank of Bahia; Agricultural and Industrial Development Fund (FUNDAGRO)
- State of Espírito Santo: Agricultural Credit Bank of Espírito Santo
- State of Rio de Janeiro: Bank of the State of Rio de Janeiro
- State of Minas Gerais: Development Bank of Minas Gerais (BDMG); Credit and Finance Company of Minas Gerais (COFIMIG)
- State of Guanabara: Development Company of the State of Guanabara (COPEG); Bank of the State of Guanabara (BEG)
- State of São Paulo: Bank of the State of São Paulo
- State of Paraná: Bank of the State of Paraná Economic Development Company of Paraná (CODEPAR)
- State of Santa Catarina:: Development Bank of the State of Santa Catarina
- State of Rio Grande do Sul: Bank of the State of Rio Grande do Sul Capital Mobilizers S.A. (MOCASA)
- Mato Grosso: Bank of the State of Mato Grosso
- State of Goiás: Bank of the State of Goiás

/(b) Fiscal

(b) Fiscal privileges for regional development.

As was mentioned above, both the Federal Government and the states have engaged to level the income of the different regions and states by programming economic development and financing it through direct loans to prive enterprises. But the incentives granted have not been confined to credit operations as such. Besides encouraging the preparation of technical projects and studies and providing assistance to enterprises through their planning and advisory agencies, the Federal Government and the state government grant fiscal exemptions. By article 34 of Law 3,995/61 the Federal Government, taking into account that the North-East contains one-third of the country's population and that its development has not kept pace with that of the national economy, which has widened the disparity regional between it and other regions, authorised legal persons with wholly national capital to deduct up to 50 per cent from their proper income tax for each financial year if they invest that sum in industries located or to be located in the North-East which are consired by SUDENE to contribute to the development of that region. By Law 4,216/63 the Federal Government extended to the Amazon region the benefits granted to the North-East, on condition that the investments concerned are made in activities considered by SPVEA to contribute to the development of the region.

The policy of economic promotion by means of fiscal exemptions has also been adopted by the state and municipal administrations. Most of the Brasilian states have passed laws favouring the installation of new industries which use local and regional raw materials.

In order to attract the resources of the more developed regions (South-East and South) the states and municipalities of the less developed regions (North, North-East and West-Centre) offer priority activities exemptions of up to 100 per cent for periods of up to 15 years. These exemptions are often a matter of competition between states or even municipalities and distort the real advantages of location in the areas concerned, as well as unduly burdening the respective treasuries.

In order to discipline and co-ordinate the regional bodies falling within the federal sphere the Federal Government created and defined the powers of a Ministry Extraordinary for Co-ordinating Regional Bodies, by Law 4,344 of 21 June 1964 and Decree 54,020 of 17 July of the same year.

/10. Development

10. Development policy for the infrastructure sectors

(a) Transport

The re-equipment and expantion of the different means of transport has always been one of the first objects of Brazilian development plans. The huge size of the country and the need to bring its producing areas closer to their various markets, induced the Government to take up a decided attitude with regard to this sector. The Brazil-United States Mixed Commission prepared the first and most far-reaching programme for the different domestic transport systems. After the Economic Re-equipment Fund and the BNDE had been created, the latter during its first years of activity gave preferential treatment to the transport sector, particularly rail transport. Its contribution to the financing of other forms of transport was relatively modest, since it was obvious that they had other sources. The creation of the Federal Railways Network S.A. in 1957 and the subsequent increase in public resources allocated specifically to investment in trasport services then freed the Bank from the task of financing the re-equipment of this sector.

Resources - in the form of the Port and Merchant Marine Funds have been provided specifically for the ports and sea and river navegation; the first provides for port maintenance and amplification and the second for the purchase and maintenance of shipping. The whip-building industry has been stimulated by orders for ships of large tonnage.

Road transport has grown enormously, as is reflected in the increase of vehicles, having been stimulated by the shortage of water transport and by the National Roadworks Plan's provisions for the construction of new roads, the repair of existing ones, the paying of the major roads giving access to the great markets and the consolidation of the system of penetration roads. The increase in the number of vehicles was partly due to the work of the domestic motor vehicles industry and to the small concentration of capital needed for forming road transport enterprises and their corresponding multiplication. Road and rail transport are financed from the revenue of the single tax on lubricants, which is distributed between the two sectors and

/there administrated

there administrated by the National Roads Department (BNER) and the Federal Railways Network S.A. respectively. The part of the tax due to road transport goes form a special fund, the National Road Fund.

Lastly, it may be added that considerable progress has been made by commercial aviation in Brazil. Thanks to special treatment granted it by the Federal government it could purchase modern aircraft, equip its airports with flight protection systems, construct runways for aeroplanes of grater size and speed, and extend or create air transport lines. The great distances separating the differnt parts of Brazil and the lack of other means of transport have obliged the Government to take an active interest in this sector.

The Government has acted in the field of transport not only through the creation of the infrastructural conditions for its development and direct investments for the expansion of the sector by private initiative, but has also contributed financing guarantees, technical aid, fiscal incentives, etc.

(b) Electric power

In view of the growing potential demand within the economic development process the Federal Government's participation in the field of electric power was inevitable. The exploitation of the electric power potential of the many existing waterfalls required the investment of large resources on a long-term basis; and since this type of venture did not attract private enterprises it fell to the Government to take the initiative. Until it did so electric power stations were small and of municipal coverage, But the constant increase in demand for power and its importance for the development process induced the Government to prepare single overall plans a view to organising power generation and transmission on a regional basis. The Federal Electrification Fund, whose resources come mainly from a single tax on electric power, supplemented by state funds destined for the purpose, was created in order to mobilize the necessary financial resources. However, on account of certain structural deficiencies in its sources of income, its fund soon became too small to carry out the projects for the sector. Here again, since power generation and transmission were

/considered to

considered to have priority for purpose of financing and guarantees, the BNDE was brought in to finance their implementation. On becoming the depositary and administrator of the Federal Electrification Fund in 1956, the BNDE was also able to use this source of financing for the sector. Later, in order to bring electric power policy under a single agency, Law 3,890 - A of 25 April 1961 created the state enterprise Brazilian Electric Power Stations (ELECTROBRAS), to which the resources of the Federal Electrification Fund were transferred. In the south of the country steps were taken to build thermoelectric stations, which are more suitable in A region of wide plains with coal deposits.

A number of studies have been made on the electric power sector, including that of the Brazil-United States Mixed Commission (1954), A the National Electrification Plan (1954), that of ECLA/BNDE (1955) and that of ECLA; this last was submitted at the Bogotá Conference in 1955. The method used in it was different from that of the previous study. Although these studies were prepared independently, using different techniques, they all concluded that the cumulative growth rate of installed power should be approximately 10 per cent a year.

Although generating capacity has remained equal to electric power consumption needs at the national level, it is in many cases not so at the regional level; the Federal Government is taking steps to correct this disequilibrium and to interconnect the different existing generating and distribution systems. It may be added that the electric power sector has been absorbing such a large quantity of resources as to limit Federal Government allocations to other sectors, which from their importance for development require more intense and vigorous promotion; the Government has, therefore, created incentives, mainly involving capital profitability, for inducing private initiative to invest in the sector.

In 1964 the Government Action Programme gave priority to public investments destined for creating external economies in the underdeveloped regions.

/11. Productivity

11. Productivity and industrial extension services

The publication of the concept of productivity is in the hands of the National Centre for Industrial Productivity (CENPI), which, however, being only a department of the Naticanl Confederation of Industries, is highly restricted in its activities.

As a central agency CENPI has functions in connexion with standardization and co-ordination as well as the above. It operates through twenty State Industrial Productivity Centres (CEPI), which are in turn subordinate to the Local Federation of Industries in each state. These state centres, like the central agency, have minimal financial resources (300,000 cruseiros a month). As they can give no effective technical assistance to industry they promote TWI type courses from which they obtain an additional income. CENPI's work in its six years of existence has been as follows:

(a) It organized two national seminars outside Rio de Janeiro, whose reports contain noteworthy studies and recommendations, which however, did not have the desired effect from lack of receptivity and interest among the producing classes and the authorities;

(b) It held fifteen major seminars in various parts of the country that were attended by North American experts and assisted financially by the International Development Agency under annual agreements which have been renewed since 1962;

(c) In the penultimate stage of the AID/CENPI agreement a demostration of productivity improvement techniques was held in six factories taken a experimental cases. The result were magnificent: production was increased by 50 per cent or over without new investments or increases in the labour force;

(d) At present, while the agreement with AID is still in force, a programme for employing the services of nine North American experts to give technical assistance in five enterprises (six months in each) is being undertaken.

The local centres will co-ordinate the work of these experts and as far as possible ensure that the enterprises and unions take full advantages of the programme.

There are other organizations that work to increase productivity independently of CENPI; in this connexion may be mentioned the programmes now under way of the Institutes of Administration and Management of the Catholic University of Rio de Janeiro and of the Getulio Vargas Foundation, INDORT's work, the efforts of the Management Centre of Brazil, the projects already carried out by the Development Company, of the State of Guanabara(COPEG) and by the Bank of the State of Guanabara and, finally, the courses of the State Industrial Productivity union (CEPI) of Rio de Janeiro and of the engineering school of the Federal University of the same state.

Work on publicising the concept of productivity and raising productivity levels in Brazilian industry is still incipient. The agencies working directly or indirectly in this field do not have sufficient resources. CENPI, for example, has only enough to pay the rent of its offices, subsidise a small number of expenditures and provide 300,000 cruzeiros a month to each state centre. The same may be said of the other organizations engaged in this field.

However, the National Federation of Industries is now trying to get the Federal Government to approve the creation of a Brazilian productivity centre which would have functions identical with those of the national productivity centres of other countries.

Lastly, a word should be said on industrial personnel training. Although work in this field is not far enough developed to meet the needs of the country, notable efforts have been made. The National Industrial Apprenticeship Service (SENAI), an organisation associated with the National Confederation of Industries, maintains a large number of middle-level training centres throughout the country, oriented mainly towards the training of technical personnel for industry. In addition to these, there are a number of professional training centres which operate under the surveillance of the Ministry of Education and Culture and the State Secretariat of Education.

/12. Technological

12. Technological research

Activities for remedying the lack of national technical standards and of a national technology capable of preparing projects based on the conditions and characteristics of local industry and thus favouring the placing of orders within the country (particularly in heavy industry) are primarily conducted by the Brazilian Technical Standards Association (ABNT) and the Brazilian Association for the Development of the Basic Industries (ABDIB), both private organizations. They have helped introduce and propagate standardization and quality control and co-operate actively with the Executive Groups created to assist the Government in matters relating industrial development policy. State and parastate enterprises are obliged by law and private enterprises, if they wish to take advantage of the market provided by government projects or to benefit from the productivity increase which results from adherence to the standards established are impelled by interest to adopt the recommendations of these groups. In addition to these organizations of a general character there are others concerned with more specific fields, such as the Brazilian Industrial Projects Company, a subsidiary of the National Steel Company, which prepares projects for national steel enterprises and for other sectors of industry, the Brazilian Petroleum Institute, which tries to standardize the production of equipment for the petroleum industry, and the Brazilian Steel Institute, which arranges for technical assistance to industry.

On 29 May 1964 there was created within the BNDE a special fund - the Fund for Technico-Scientific Development - to be administrated by the Bank. This Fund has normal BNDE resources and is eventually to be made up of a fixed portions of five thousands million cruseiros to be accumulated within four years from 1964 and a variable portion which from 1968 onwards will consist of 1 per cent of the total annual value of the operative balance of the surcharge on income tax. Its resources will be allocated in the following manner:

(a) 40 per cent will be assigned for running post-graduate courses for aspirants to masters' and doctors' degrees in science (physics, chemistry, chemical engineering, metallurgic engineering, mechanical engineering, electrical engineering);

(b) 60 per cent will be assigned for technico-scientific research, understanding by this programmes, experimental projects and experiments in the field of basic industries that have as their object to facilitate or guide the absorption of technological innovations by domestic industry, to adapt or adjust industrial production processes and techniques to the degree of development and other special features of the national economy, to design and improve industrial production process and techniques which will allow an intensive exploitation of the country's natural resources, or to design Brazilian technical standards for the basic industries, especially the machinery construction industries.

The BNDE determines the form in which these allocations are to be made: donation, subsidy, reimbursable loan or partnership in the company concerned.

The organisations receiving resources from the Fund must comply with certain conditions, among which of particular importance for industrial development is the obligation to give preference in these and research to development problems of concern to the Bank or to enterprises designated by it.

Important work has been done in industrial technological research by the National Institute of Technology of the Ministry and Trade, which is responsible for doing research, making tests and supplying information to interested parties. Similar functions are performed by the Technological Research Institute of the State of São Paulo, a foundation of the government of that State.

Research and training of specialised engineers in the field of mining and metallurgy has been carried out for many years by the Mining School at Ouro Preto in the State of Minas Gerais.

/V. CHIEF

V. CHIEF SECTORS OF MANUFACTURING INDUSTRY

Brazil's industrial development has taken the form of a rapid and far-reaching import substitution process. In guiding this process the Brazilian authorities have attached particular importance to certain specific sectors.

As well as modifying and stimulating the basic infrastructural services by means of fiscal and credit incentives and administrative measures they have taken steps to produce a substantial increase in the domestic supply of secondary sector products for which it was necessary to mobilize large domestic and foreign resources. Under this policy, which began to take effect in 1955, priority was given to backward strategic sectors and to these which constituted serious bottlenecks for the development of other branches of the economy. Special attention was accordingly paid to the iron and steel, non-ferrous metals, pulp and paper, cement, fertilizer, motor vehicle and ship-building sectors, among others, whose main features will be considered in the following pages.

1. Steel

Brazil's annual consumption of steel ingots rose from 415.4 thousand tons in 1938 to 1,363.2 thousand in 1953 and to 3,313 thousand in 1964. The average growth rate of consumption in the recent period (1953-1964), though slightly lower than that of the period 1938-1964 (approximately 9.6 per cent a year) is, at approximately 9 per cent, still very high.

The evolution of apparent consumption and its components - domestic production, imports and exports - during 1953-1964 is shown in table 19.

Domestic production began on a large scale when the President Vargas Works (National Steel Company) in Volta Redonda, State of Rio de Janeiro, was brought into operation in 1946. In that year it rose by 66.4 per cent on the previous year to 342.6 thousand tons and accounted for 36.8 per cent of consumption. By 1953 it had increased to 1,016.3 thousand tons (74.6 per cent of apparent consumption) and by 1964 to 3,028.5 thousand tons (91.4 per cent of apparent consumption).

/Table 19

Table 19

BRAZIL: APPARENT CONSUMPTION OF STEEL INGOTS, 1953-1964

(Thousands of tons)

Years	Domestic production a/	Imports b/	Exports b/	Apparent consumption
1953	1 016.3	346.9	-	1 363.2
1954	1 148.3	886.0	-	2 034.3
1955	1 162.5	516.8	14.8	1 664.5
1956	1 364.8	352.0	7.0	1 709.2
1957	1 470.0	532.4	11.2	1 991.2
1958	1 659.0	288.7	1.9	1 945.8
1959	1 866.0	670.9	0.4	2 536.5
1960	2 279.0	568.8	23.1	2 824.7
1961	2 485.0	450.0	10.5	2 924.6
1962	2 557.0	384.6	6.6	2 935.0
1963	2 812.4	652.9	1.5	3 463.8
1964	3 028.5	390.7	106.0	3 313.2

Sources: a/ National Steel Company.

b/ Economic and Financial Statistics Service of the Ministry of Finance.

/The fact

The fact that the growth of the Brazilian steel industry in its most intensive stage coincided with notable technological innovations in world steel production; that the country had rich and abundant ore deposits, favourably situated; that the domestic market was of sufficient size to permit the installation of large-scale units, which are just those which can make best use of the latest technological innovations: all these combined to give Brazil steel mills of the most modern kind which not only enabled it to attain relative self-sufficiency within a short period but successfully to enter the international steel market.

Table 20 shows steel production and consumption estimates in equivalent ingots and the corresponding balance for 1965-1970.

Table 20

BRAZIL: STEEL INGOT PRODUCTION AND CONSUMPTION PROJECTIONS FOR 1965-1970

(Thousands of tons)

Years	Domestic production (A)	Consumption		Exportable surplus Balance between projected production and consumption	
		(B) a/	(C) b/	D = A - B	E = (A-C)
1965	3 440	3 300	3 300	140	140
1966	3 610	3 620	3 600	-10	10
1967	4 040	3 960	3 920	80	120
1968	4 500	4 340	4 270	160	230
1969	4 850	4 760	4 650	90	200
1970	6 030	5 220	5 070	810	960

Source: BNDE.

a/ $Y = Y_o 1.106^x$.

b/ $Y = Y_o 1.09^x$.

/2. Cement

2. Cement

In the last three years Brazil's cement consumption has grown by an average of only 5.7 per cent a year cumulative (7 per cent, 4 per cent, and 7 per cent on each preceding year), as against 9.7 per cent a year cumulative in 1946-1960.

This decline is obviously a reflection of the behaviour of the economy as a whole, whose growth index also began to fall in 1962; according to the journal Conjuntura Econômica (February 1965) the income only rose by 3.7 per cent in that year on 1961, 2.0 per cent in 1963 on 1962 and 3 per cent in 1964 on 1963, while its average annual growth in 1957-1961 was 7 per cent.

Table 21 shows the evolution of apparent domestic cement consumption in 1946-1964 by origin of product; it can be seen that since 1956 Brazil has been practically self-sufficient in this product.

The country is in an excellent position to undertake large-scale cement production because besides having a large and dynamic market it possesses deposits of optimum quality limestone and of gypsum in several regions.

However, considering production from a regional point of view, there are some areas which cannot supply whole of their own requirements of the main raw material (limestone) and are, therefore, partly dependent on factories situated in other regions. Sometimes small quantities have to be imported, as has been done by Rio Grande do Sul from Uruguay.

The development prospects of the cement industry for 1965-1970 must be considered in the light of two basic premises:

(a) The domestic industry will develop in step with domestic demand;

(b) Government policy is to grant the sector whatever incentives are necessary for it to maintain this position.

/Table 21

Table 21

BRAZIL: CEMENT CONSUMPTION, 1946-64

(Thousands of tons)

Year	Production a/	Imports	Exports	Consumption
1946	826	345	1	1 170
1947	914	339	-	1 253
1948	1 112	351	1	1 462
1949	1 281	428	-	1 709
1950	1 386	394	-	1 780
1951	1 456	638	-	2 094
1952	1 619	812	-	2 431
1953	2 030	982	-	3 012
1954	2 412	332	-	2 744
1955	2 733	242	-	2 975
1956	3 272	31	3	3 300
1957	3 376	9	5	3 380
1958	3 769	-	4	3 765
1959	3 818	29	5	3 842
1960	4 444	1	3	4 442
1961	4 708	-	3	4 705
1962	5.072	1	2	5 071
1963	5 184	6	3	5 187
1964	5 563	26	-	5 589

Sources: National Syndicate of the Cement Industry and Economic and Financial Statistics Service of the Ministry of Finance.

a/ Includes a small proportion of white cement.

/Table 22

Table 22 gives the projection of domestic consumption of standard Portland cement for 1965-1970, calculated on the basis of the observed trend of 1954-1964, under two growth hypotheses: the figures of column A were calculated on a hypothesis of linear growth, with an equation of the type $Y = A + BX$; those of column B by applying to the years 1965-1970, the average annual geometric growth rate for 1954-1964 of 7 per cent, which figure was determined assuming an exponential evolution of consumption and using for the adjustment curve an equation of the type $Y = AB^x$.

Table 22

BRAZIL: PROJECTION OF DOMESTIC CONSUMPTION OF STANDARD PORTLAND CEMENT FOR 1965-1970 ACCORDING TO TWO GROWTH HYPOTHESES

(Thousands of tons)

Years	Hypotheses	
	A a/	B b/
1965	5 900	6 120
1966	6 200	6 580
1967	6 500	7 070
1968	6 800	7 600
1969	7 100	8 160
1970	7 500	8 770
1965-1970	40 000	44 300

a/ $Y = A + B^x$.
b/ $Y = 1{,}075^x$.

Since the values of column A, from the use of a linear growth hypothesis for a phenomenon whose behaviour is typically sumulative, are likely to be under-estimates and those of column B - particularly for the last years of the series, as an effect of the type of adjustment

/curve used -

curve used - to be over-estimates, these two series may reasonably be taken to constitute the maximum and minimum limits that of demand in the period under consideration. Consequently, total consumption will be somewhere between 40.0 and 44.3 million tons in 1965-1970 and 7.5 and 8.8 million tons in 1970.

In previous years the existing cement factories have succeeded in operating on a mean factor of utilization of their respective installations of over 90 per cent. And though this co-efficient seems high, it has been surpassed on many particular occasions. However, in the last three years there has been idle capacity in several factories, from the drop in the growth rate of cement consumption. As a result, in 1964 the mean utilization of total production capacity was only 85 per cent.

Assuming that in 1970 consumption will reach the upper limit envisaged (8.8 million tons) and that the industry will operate with a 90 per cent utilization factor, a nominal production capacity of 9.8 million tons/year will be needed for total self-sufficiency.

This figure may, therefore, be set as the Brazilian cement industry's target for 1970. It will represent an increase on its 1964 nominal capacity (6.6 million tons) of 3.2 million tons/year.

3. Non-ferrous metals

The development of the basic industrial sectors that has taken place in the post-war period, chiefly in 1957-1961, has considerably increased domestic demand for non-ferrous metals.

As regards the manufacture of intermediate and semi-finished non-ferrous metal products, Brazil has capacity enough to supply practically the whole of domestic demand, and the expansion of this area of production, when the development process requires it, does not present any special difficulty. However, much remains to be done as regards primary metallurgy, since in overall terms the country still imports about two-thirds (in weight) of its total consumption of non-ferrous metals. In 1964 85,000 tons in weight and 45 million dollars in value of the following metals were imported (taking into account only imports in a raw or semi-processed state): copper, aluminium, zinc, tin, lead, nickel and magnesium.

/Considering each

Considering each of these metals in turn, the domestic situation may be summarized as follows:

Brazil has extensive aluminium reserves, which are conveniently situated and susceptible of immediate exploitation. This puts it in the best position of any Latin American to undertake the production of this metal. Installed production capacity corresponds to two-thirds of present demand and it is only a matter of time - when greater investments have been made in the sector - before self-sufficiency will be reached. Within 8 to 10 years domestic production capacity will be enough for the country to begin exporting.

The main problem with regard to copper, lead and tin is that the country lacks potentially economic reserves, which makes any expansion plan based exclusively on the mobilization of internal production factors purely speculative.

The known reserves of copper - the non-ferrous metal which constitutes the heaviest drain on the balance of payments - are too small and of too low tenor to be exploited intensively. Domestic production of raw copper - for which installed capacity is approximately 3,000 tons/year - has, therefore, small prospects of expansion. Electrolytic refining capacity is rather larger - 6,000 tons/year.

The basic problem with regard to lead is again that of scarcity. Known reserves are somewhere around 200,000 tons (in terms of metal content) and installed production capacity is 18,000 tons/year, which represents about 60 per cent of present consumption of raw lead.

As regards tin, the country has an installed capacity more than large enough for the demand of the next decades, but depends on foreign supply for about 55 per cent of its cassiterite. There are, however, good prospects of discovering new ore reserves and starting mines, particularly in the Rondonia region. If these materialize the country will be able to be total self-sufficient within a few years.

A final solution to the problem of nickel and zinc supplies is now in sight, since new technological processes developed in the country will enable the relatively abundant silicated nickel and zinc ores to be exploited economically. Nickel is already produced in the country, but only in the form of ferronickel, and the industrial process for producing electrolytic nickel from the native silicated ores has not yet been fully mastered.

Two factories for the production of zinc are now being installed and will begin to operate in the next two years (1966 and 1967) with an initial production capacity of 17,000 tons/year of metallic zinc. Both will use new technological processes enabling them economically to exploit oxidated ores.

(a) Aluminium

Brazil has excellent prospects of becoming self-sufficient in this non-ferrous metal in a relatively short time - better than for any others - since it possesses all the main factors necessary for its production.

There are bauxite deposits in several regions of the country, the best, which contains a total of over 40 million tons and has an average chemical content of recoverable aluminium of over 55 per cent, being at Poços de Caldas (State of Minas Gerais), roughly equidistant from the cities of São Paulo, Rio de Janeiro and Belo Horizonte, between which lies the most dynamic geo-economic region of Brazil. Besides possessing excellent road and rail communications with these three industrial centres, Poços de Caldas has electric power in plenty, since high-tension lines from the Furnas hydroelectric power station, the distribution centre of one of the country's most powerful energy systems, pass through it. It provides, therefore, outstanding conditions for the installation of a large-scale primary aluminium industry and might even have access to foreign markets, mainly in the LAFTA countries.

There are at present two enterprises producing primary aluminium, whose joint installed capacity is approximately 35,000 tons/year; this represents nearly 70 per cent of present consumption, which is about 50,000 tons. They have plans for increasing their joint production capacity to 60,000 tons by 1970, when domestic consumption should be 90 thousand tons.

Table 23 shows the evolution of primary consumption in 1946-1964.

Apparent consumption was lower in 1964 than in 1963 after having grown by an average 10 per cent a year in 1946-1963; but it is believed it will

Table 23

BRAZIL: PRIMARY ALUMINIUM CONSUMPTION, 1946-1964

Years	Quantities (1 000 tons)				Percentage relation of production to consumption
	Imports				
	Raw material	Manufactures and semi manufactures	Domestic production	Apparent consumption b/	
	A	B	C	D	E = $\frac{C}{D}$
1946	4.3	0.8	0.8	5.9	13.6
1947	8.7	0.9	-	9.6	-
1948	8.2	0.4	-	8.6	-
1949	10.2	1.1	-	11.3	-
1950	10.5	0.7	-	11.2	-
1951	15.5	4.8	0.4	20.7	1.9
1952	11.0	1.7	1.1	13.8	8.0
1953	11.8	2.0	1.2	15.0	8.0
1954	17.5	2.3	1.4	21.2	6.6
1955	6.7	3.8	1.7	12.2	13.9
1956	14.2	4.6	6.3	25.1	25.1
1957	13.3	7.1	8.8	29.2	30.1
1958	14.3	7.0	9.2	30.5	30.2
1959	9.3	7.0	15.2	31.5	48.3
1960	15.0	5.6	16.6	37.2	44.6
1961	18.5	5.3	18.5	42.3	43.7
1962	19.7	3.0	21.7	44.4	48.9
1963	26.0	1.6	23.0	50.6	45.4
1964 a/	18.7	1.3	25.0	45.0	55.6

Sources: Economic and Financial Statistics Service of the Ministry of Finance; Production Statistics Service of the Ministry of Agriculture; BNDE, Economic Department.

a/ Preliminary data, subject to revision.

b/ First smelting aluminium. It is estimated that recovered aluminium represents about 15 per cent of total consumption, which would raise the figures of column D by approximately 18 per cent.

Table 24 gives the projection of domestic consumption of primary aluminium for 1965-1970, which was calculated on the basis of the annual growth rates envisaged in the different industrial sectors that consume it.

Table 24

BRAZIL: PROJECTED CONSUMPTION OF PRIMARY ALUMINIUM, 1965-1970

(Thousands of tons)

Years	Projected consumption
1965	57.5
1966	62.8
1967	68.3
1968	74.6
1969	82.0
1970	90.0
1965-1970	435.0

Table 25 shows the shares in consumption of the different consuming sectors in 1961, and the projected growth rates of each of these consumptions during 1965-1970.

/Table 25

Table 25

BRAZIL: SECTORAL SHARES IN ALUMINIUM CONSUMPTION IN 1961 AND PROJECTED ANNUAL GROWTH RATES OF SECTORAL CONSUMPTIONS DURING 1965-1970

(Percentage)

Aluminium consuming industrial sectors	Percentage share of each sector in apparent consumption in 1961	Projected annual growth rate during 1965-1970
Domestic appliances	17	8.6
Transport	14	9.4
Electric power	13	10.5
Civil construction	8	12.0
Packing	8	5.1
Steel industry	4	8.0
Others	36	8.7
Total	42 500t	9.0

(b) Copper

Copper consumption in Brazil has grown slowly in comparison with that of other metals, with an average annual rate of 3 per cent in the post-war period. While this low rate is not entirely surprising, considering that in the last 25 years that of world consumption has been even lower, it might have been expected to be higher in view of the very rapid industrial growth of the country in the last fifteen years.

The causes of this relatively slow growth are not entirely clear, but two plausible hypotheses may be advanced:

(i) Copper consumption only expands in the more advanced stages of industrial development, which Brazil has only recently reached;

(ii) Copper is now being replaced by other products more rapidly than ever before and precisely in the sectors that become most important at Brazil's stage of industrial development.

(Table 26

Table 26 shows the evolution of apparent consumption of primary copper in 1946-1964. As was said above, the average annual growth rate during this period was not quite 3 per cent. However, it is as well to bear in mind that real consumption must have been roughly 25 per cent more than the figures given, since recovered copper satisfies 20 per cent of effective consumption.

Table 27 gives the projection of Brazilian primary copper consumption for 1965-1970, which was based on a linear growth hypothesis for consumption, adjusted according to the moving quinquennial averages for apparent consumption in 1952-1964.

The moderate growth projected (average rate of slightly less than 5 per cent a year) should cause no surprise, since, as was stated above, this has been the trend throughout the world.

Copper is the most costly item in Brazil's non-ferrous metal imports, accounting for nearly 50 per cent of their value.

The considerable irregularity in the annual volume imported bears no relation to the fluctuations in domestic consumption and must be attributed to stock manipulations. On account of the industrial development of the period the composition of these imports has undergone a permanent alteration: raw materials which were 77 per cent of the total in 1946-1948 rose to 95 per cent in 1962-1964.

Until 1961 Brazil's chief suppliers of copper were the United States and West Germany - themselves net importers of copper in the international market; in 1958-1961 these two countries supplied over 50 per cent of the country's requirements, while imports from the Latin American countries were of little importance. However, in 1962-1964 the LAFTA countries became practically the sole suppliers.

Brazil's own primary copper production is still very small (see table 26), amounting to about 2,500 tons a year. Further development of the copper industry will only take place if new deposits are discovered, since the known reserves are too small to justify intensive exploitation and industrial development. This, then, is the chief obstacle to the development of domestic production, the solution to which would be to step up preinvestment in ore prospection.

/Table 26

Table 26

BRAZIL: PRIMARY COPPER CONSUMPTION, 1946-1964

(Tons)

Years	Imports					Domestic production	Apparent consumption a/
	In kind		Content in products		Total imports		
	Crude raw material (A)	Manufactures and semi-manufactures (B)	Alloys (C)	Chemical compounds (D)	(E)	(F)	(G)
1946	21 839	3 094	2 623	545	28 101	-	28 101
1947	17 092	3 475	1 894	148	22 609	-	22 609
1948	11 391	2 230	499	461	14 581	-	14 581
1949	23 205	2 810	1 865	525	28 405	-	28 405
1950	22 240	3 091	1 799	767	27 897	-	27 897
1951	22 839	3 244	1 866	624	28 573	-	28 573
1952	20 333	3 946	2 618	579	27 476	-	27 476
1953	18 993	2 422	723	1 327	23 405	-	23 405
1954	34 972	8 079	3 222	1 362	47 635	-	47 635
1955	14 401	1 604	194	641	16 840	339	17 179
1956	19 733	741	397	1 193	22 064	1 250	23 314
1957	27 066	1 218	1 131	889	30 364	1 720	32 084
1958	26 099	1 132	101	1 132	28 524	1 360	29 884
1959	20 141	334	85	649	21 209	1 800	23 009
1960	28 995	654	165	1 110	30 926	1 212	32 138
1961	36 025	390	120	800	37 335	1 653	38 994
1962	42 012	240	156	1 891	44 299	2 000 b/	46 299
1963	48 117	227	162	1 659	50 165	2 000 b/	52 165
1964	27 810	229	73	1 356	29 468	3 000 b/	32 468

Sources: Economic and Financial Statistics Service of the Ministry of Finance and Production Statistics Service of the Ministry of Agriculture.

a/ First smelting copper only. Real consumption is estimated at 25 per cent more since there is a considerable consumption of copper recovered from copper waste (secondary copper).

b/ Estimates.

Table 27

BRAZIL: PROJECTED CONSUMPTION OF PRIMARY COPPER IN 1965-1970

(Thousands of tons)

Years	Projected consumption
1965	42
1966	44
1967	46
1968	48
1969	50
1970	52
1965-1970	282

(c) Magnesium

Although Brazil is the largest consumer of this metal in Latin America, it consumes very little of it in comparison with the other non-ferrous metals.

Table 28 shows Brazilian imports of metallic magnesium in 1957-1964, classified according to their form (crude raw material or processed products).

Table 28

BRAZIL: IMPORTS OF METALLIC MAGNESIUM,[a] 1957-1964

(Tons)

Years	Crude raw material	Processed products	Total
1957	10	12	22
1958	66	92	158
1959	44	320	364
1960	57	533	610
1961	92	898	990
1962	610	500	1 110
1963	1 807	3	1 810
1964	1 501	1	1 502

Source: Economic and Financial Statistics Service of the Ministry of Finance and BNDE, Economic Department.

The abrupt change in the composition of these imports in 1962 was due to the installation of a foundry by Volkswagen of Brazil (the main consumer of the metal), which in that year began domestically to cast motor blocks for vehicles of that mark.

Since the motor vehicle industry is the major consumer - a situation little to change in the near future - the future evolution of this metal's consumption levels will be closoly linked to the possible expansion of this industry. Thus, on the basis of the co-efficients of metal used per vehicle produced and of an estimate of production of Volkswagen vehicles during the next few years, according to two growth hypotheses (10 and 15 per cent a year respectively), assuming that the motor vehicle industry will continue, as it has done in the last few years, to satisfy 90 per cent of demand, the following projection of magnesium consumption in 1965-1970 was made.

Table 29

BRAZIL: PROJECTIONS OF MAGNESIUM CONSUMPTION, 1965-1970

(Tons)

Years	Projections of consumption	
	a/	b/
1965	1 590	1 660
1966	1 750	1 900
1967	1 920	2 190
1968	2 110	2 520
1969	2 320	2 900
1970	2 550	3 330

Source: BNDE/DE.

a/ $Y_n = Y_o \cdot 1.10^x$.

b/ $Y_n = Y_o \cdot 1.15^x$.

/(d) Zinc

(d) Zinc

Zinc consumption in Brazil has grown very rapidly in the last fifteen years. Its average annual rate of over 7 per cent was twice as high as that of world consumption during 1935-1961. This was obviously due to the notable development of the Brazilian economy in the post-war period, combined with the scant possibilities of substituting for zinc in most of its industrial applications under the technology used in the country.

Column A of table 30 shows annual apparent consumptions of zinc, comprising not only the metal imported in kind but such of it as constituted a major component in other imported products.

In order to give a less distorted picture of the series shown by taking into account its fluctuations, which conform to observed irregularities in imports, the quinquennial moving averages of the apparent consumption data were calculated; the figures thus obtained were adjusted by the method of least squares, according to a hypothesis of exponential growth. These results appear in columns B and C of table 30.

The projection of zinc consumption in 1965-1970 shown in table 31 is based on the historical consumption trend of 1946-1964.

The data of the preceding table were obtained by simple extrapolation from the adjusted data of column C of table 30. The growth rate of consumption projected by this means is comparatively high - 7.2 per cent a year -, only aluminium having a higher rate projected for the same period.

Although domestic consumption has diminished in the last two years it may be hoped that with the expected recovery in the rate of development it will maintain the projected growth rate until 1970.

Table 32 shows zinc imports during 1946-1964, classified according to the main forms in which the metal was imported. Since Brazil as yet produces almost no zinc, and re-exports are negligible in quantity and value, domestic consumption may be taken to be the same as imports.

/Table 30

Table 30

BRAZIL: APPARENT AND ADJUSTED CONSUMPTION OF PRIMARY ZINC, 1946-1964

(Tons)

Years	Consumption		
		Adjusted	
	Apparent A	Quinquennial moving averages B	$Y = AB^x$ C
1946	12 189	-	14 967
1947	14 826	-	16 045
1948	10 632	15 834	17 200
1949	19 106	18 331	18 438
1950	22 429	19 541	19 766
1951	24 672	21 508	21 189
1952	20 874	25 657	22 715
1953	20 471	26 720	24 350
1954	39 848	28 472	26 103
1955	27 736	30 275	27 982
1956	33 433	32 085	29 997
1957	29 888	29 689	32 157
1958	29 518	31 918	34 472
1959	27 872	33 513	36 954
1960	38 880	38 436	39 615
1961	41 406	42 419	42 467
1962	54 503	44 872	45 525
1963	49 413	-	48 803
1964	40 141	-	52 317

Sources: Economic and Financial Statistics Service of the Finance Ministry and BNDE, Economic Department.

/Table 31

Table 31

BRAZIL: PROJECTION OF PRIMARY ZINC CONSUMPTION, 1965-1970

(Thousands of tons)

Years	Quantities
1965	56.1
1966	60.1
1967	64.5
1968	69.1
1969	74.1
1970	79.4
1965-1970	403.3

The whole present production of the country is carried out in the pilot plant of the Industrial and Mercantile Company Ingá in the State of Rio de Janeiro, whose capacity is 20 kilogrammes a day. Brazil's backwardness in this respect is mainly due to the fact that no deposits of sulfated ore susceptible of treatment by the classical processes have yet been discovered.

(e) Tin

Brazilian tin production began, for practical purposes, in 1953, when the Tin Company of Brazil (CESBRA) installed its plant at Volta Redonda, State of Rio de Janeiro. Its production now represents about 80 per cent of country's total supply of primary tin.

Table 33 shows the apparent consumption and domestic production of tin in Brazil during 1950-1964; it can be seen that consumption grew slowly during the period, while domestic production constantly increased its share in it.

/Table 32

Table 32

BRAZIL: ZINC IMPORTS, 1946-1964

(Tons)

Years	Imports				
	In kind		In other products		
	Crude or prepared raw material A	Manufactures or semi-manufactures B	Alloys and galvanized products C	Chemical compounds D	Total imports E
1946	4 319	1 367	2 898	3 605	12 189
1947	3 315	1 477	3 976	6 058	14 826
1948	5 020	321	2 074	3 217	10 632
1949	10 366	308	5 588	2 844	19 106
1950	10 561	583	7 140	4 135	22 419
1951	12 783	600	7 565	3 729	24 672
1952	10 432	521	6 400	3 521	20 874
1953	13 039	426	4 177	2 829	20 471
1954	21 965	731	10 998	6 154	39 848
1955	14 340	1 442	7 720	3 874	27 736
1956	19 513	438	7 903	5 579	33 433
1957	15 577	329	10 227	3 755	29 888
1958	23 226	408	2 274	3 610	29 518
1959	22 189	324	2 718	2 641	27 872
1960	30 780	311	5 750	2 039	38 880
1961	32 850	339	5 621	2 596	41 406
1962	42 788	260	6 503	1 951	54 503
1963	39 350	100	8 226	1 756	49 432
1964	31 056	125	7 457	1 503	40 141

Sources: Economic and Financial Statistics Service of the Ministry of Finance and BNDE, Economic Department.

/Table 33

Table 33

BRAZIL: APPARENT CONSUMPTION OF TIN, 1950-1964

(Tons)

Year	Imports			Domestic production	Apparent consumption
	In kind a/	In tin plate b/	Total		
1950	1 577	243	1 819	120	1 939
1951	3 185	470	3 655	135	3 790
1952	1 242	365	1 607	117	1 724
1953	455	321	776	562	1 338
1954	346	570	914	1 880	2 794
1955	69	360	429	1 203	1 632
1956	426	473	899	1 568	2 466
1957	781	545	1 328	1 423	2 751
1958	28	165	193	639	832
1959	292	291	583	1 359	1 942
1960	42	421	463	1 512	1 975
1961	25	202	227	1 804	2 031
1962	11	176	187	2 235	2 422
1963	8	323	331	2 426	2 757
1964 c/	5	118	123	1 880	2 003

Sources: Economic and Financial Statistics Service of the Ministry of Finance and BNDE, Economic Department.

a/ Raw material and manufactures.

b/ Assuming 5 kilogrammes Sn per ton of tin plate.

c/ Preliminary data, subject to revision.

At present over half (nearly 52 per cent on average during 1960-1964) of total demand for tin is for its use in tin plate production, as can be seen in table 34.

/Table 34

Table 34

BRAZIL: APPARENT CONSUMPTION OF PRIMARY TIN IN 1960-1964, BY ORIGIN AND SECTORS OF DESTINATION

(Tons)

Classification	Years				
	1960	1961	1962	1963	1964
A. Imports	463	227	187	331	123
1. In tin plate	421	202	176	323	118
2. In kind	42	25	11	8	5
B. Domestic production	1 512	1 804	1 235	2 426	1 880
1. Tin plate	623	829	859	1 255	975
2. Other sectors	889	975	1 376	1 171	905
C. Apparent consumption	1 975	2 031	2 422	2 757	2 003
1. Tin plate	1 044	1 031	1 035	1 578	1 093
2. Other sectors	931	1 000	1 387	1 179	910

Sources: Economic and Financial Statistics Service of the Ministry of Finance and BNDE, Economic Department.

Tin consumption in 1965-1970 was projected on the basis of the recent behaviour of its consuming sectors and their development prospects, with the results that appear in table 35.

Table 35

BRAZIL: PROJECTION OF PRIMARY TIN CONSUMPTION DURING 1965-1970, BY ORIGIN

(Tons)

Years	Imports a/	Domestic production	Estimated consumption
1965	170	2 200	2 370
1966	100	2 400	2 500
1967	-	2 620	2 620
1968	-	2 740	2 740
1969	-	2 870	2 970
1970	-	3 000	3 000

a/ In tin plate.

/It is

It is expected that when the new tin plate unit of the National Steel Company begins to operate in 1967, imports of tin in tin plate will cease. However, the country will continue depending on foreign supplies of cassiterite for a number of years, since the known reserves of this ore are too small to meet total demand, satisfying only about 45 per cent of current needs.

Installed production capacity for dectrolytic tin is roughly 7,000 tons a year, almost three times present consumption.

(f) Lead

Brazil has two primary lead producing enterprises, whose joint capacity is 18,000 tons a year, and there are a number of smaller enterprises engaged only in the recovery of secondary lead.

Table 36 shows imports of lead and lead compounds during 1946-1964, expressed in terms of metallic lead. Imports of the raw metal do not show a uniform trend, but have fluctuated constantly. The chief reasons for this behaviour have been:

(i) Fluctuations in the international price of the product, together with the fact that lead can be stored indefinitely;

(ii) Changes in the Brazilian Government's exchange policy.

Column C of table 37 shows total apparent consumption of lead in the period under consideration. However, the series given contains large fluctuations which were certainly due to stock manipulations. In order to give a more realistic idea of the consumption curve, it was provisionally regularized by means of the triennial moving averages. The results appear in column D and show that domestic consumption grew slowly during the period, in close parallel to the world trend.

Lastly, as a further regularization of the series, column E was prepared; in this the consumption data for the period are adjusted according to a geometric growth hypothesis, taking as the initial and final limits of the progression the averages for the quinquennia 1946-1950 and 1960-1964 respectively. This method was chosen because it is not affected by the large fluctuations that appear in the apparent consumption figures for the period. The calculation gives a growth rate of 2 per cent a year. The projection of primary lead consumption in 1965-1970 appears in table 38.

/Table 36

Table 36

BRAZIL: LEAD IMPORTS DURING 1946-1964

(Tons)

Years	In kind			In chemical products			General total
	Crude or prepared raw material (A)	Manufactures and semi manufactures (B)	Total	Anti-knock substances	Other chemical products (C)	Total	
1946	24 137	39	24 176	...	781	781	24 957
1947	13 268	59	13 327	...	684	684	14 011
1948	4 927	27	4 954	...	916	916	5 870
1949	15 715	29	15 744	...	2 069	2 069	17 813
1950	19 924	3	19 927	...	2 755	2 755	22 682
1951	23 041	57	23 098	...	1 875	1 875	24 970
1952	10 152	38	10 196	...	744	744	10 940
1953	21 236	83	21 319	...	209	209	21 528
1954	27 588	32	27 620	...	1 102	1 102	28 722
1955	13 596	1	13 597	1 822	737	2 559	16 156
1956	10 364	1	10 365	1 923	441	2 364	12 729
1957	20 752	24	20 776	1 947	652	2 599	23 375
1958	11 927	0	11 927	2 160	700	2 860	14 787
1959	12 208	-	12 208	2 144	669	2 813	15 021
1960	8 727	-	8 727	2 339	588	2 927	11 654
1961	13 524	-	13 524	2 344	961	3 305	16 829
1962	8 081	-	8 081	2 556	812	3 368	11 449
1963	15 839	-	15 839	2 606	1 668	4 274	20 113
1964	4 216	-	4 216	-	414	414	4 630

Sources: Economic and Financial Statistics Service of the Ministry of Finance and BNDE, Economic Department.

/Table 37

Table 37

BRAZIL: PRIMARY LEAD CONSUMPTION, 1946-1964

(Tons)

Years	Annual supply		Annual consumption		
			Apparent consumption	Adjusted	
	Production	Imports		Moving triennial average	Geometric progression
	(A)	(B)	(C)	(D)	(E)
1946	2 000	24 957	26 957	-	16 504
1947	2 000	14 011	16 011	16 946	16 946
1948	2 000	5 870	7 870	14 565	17 400
1949	2 000	17 813	19 813	17 612	17 866
1950	2 470	22 682	25 152	24 248	18 345
1951	2 807	24 973	27 780	22 135	18 837
1952	2 534	10 940	13 474	21 896	19 342
1953	2 896	21 538	24 434	23 092	19 860
1954	2 645	28 722	31 367	25 289	20 392
1955	3 909	16 156	20 065	22 965	20 938
1956	4 734	12 729	17 463	21 764	21 500
1957	5 018	23 375	28 393	22 160	22 075
1958	5 837	14 787	20 624	23 188	22 667
1959	5 526	15 021	20 547	20 934	23 274
1960	9 976	11 654	21 630	23 861	23 896
1961	12 578	16 829	29 407	25 277	24 541
1962	13 346	11 449	24 795	30 428	25 203
1963	16 970	20 113	37 083	27 836	25 883
1964	17 000 a/	4 630	21 630	-	26 582

Source: Statistics Service of the Ministry of Agriculture and table 35.

a/ Estimate.

/Table 38

Table 38

BRAZIL: PROJECTED CONSUMPTION OF PRIMARY LEAD [a] IN 1965-1970

(Thousands of tons)

Years	Quantities [b]
1965	27.3
1966	28.0
1967	28.8
1968	29.6
1969	30.4
1970	31.2
1965-1970	175.3

[a] First smelting lead only. Secondary (recovered) lead consumption is also large; since it satisfies roughly one-third of the country's total lead consumption it must amount to about 50 per cent of the figures in the table.

[b] $Y = Y_0 \, 1{,}027^x$.

For total self-sufficiency in lead, in other words total import substitution, three conditions must be fulfilled:

(i) That there should be sufficient manpower trained in the ore processing techniques of the different stages leading to the final product: refined lead;

(ii) That the resources needed to expand production can be mobilized;

(iii) That there should be suitably located deposits of economically exploitable ores.

The first two of these present no special difficulties. Lead ores can be treated by the classic methods, which are universally known, can be freely used and are well and widely understood in the country. It will not be difficult to mobilize the necessary resources since the investments needed for installing a lead foundry are relatively modest.

/It is

It is with the third condition that the problem lies since the known lead ore reserves seem unlikely to allow of profitable exploitation and cannot be worked on a large scale. The best policy in this respect is, then, to make adequate preinvestments in prospection for high-grade deposits which will allow of intensive exploitation under modern production techniques.

(g) Nickel

Brazil's nickel consumption is still small - it fluctuates around 1,700 tons a year - because large-scale use of this metal belongs to the more advanced stages of industrial development, which it has not yet reached.

Table 39 shows the evolution of domestic apparent consumption in 1953-1964, by origin and chief forms in which imports were made (pure nickel, in alloys, etc.).

Domestic nickel consumption in 1965-1970 was projected in two ways, by extrapolating from its historical trend and by correlating it with steel consumption (with the latter as an independent variable):

(i) Correlation between nickel consumption and that of steel. Experience has shown that in the industrialized countries the evolution of nickel consumption bears a close relation with that of steel production. However, in projecting domestic nickel consumption on the basis of the interdependence of the two products, the correlation was drawn with steel consumption, not its production, since much of Brazil's steel is imported. In order to reduce discrepancies in the parameter to a minimum, the 1962 coefficient was taken as base; but in order to give a representative value to this latter it was taken to be the ratio of the average annual consumptions of nickel and steel during 1961-1963, which were 1,530 and 3,120 tons respectively. This gives a ration of 1 to 2,040, which would seem satisfactory for a country with the industrial structure of Brazil.

The values projected on this principle, which applear in column A of table 40, are likely to be underestimates, since they wore extrapolated from the 1962 ratio but have regard to an economy with an industrial development process fully under way.

/Table 39

Table 39

BRAZIL: NICKEL CONSUMPTION, 1953-1964

(Tons)

Years	Domestic production a/ (A)	Imports					Apparent consumption (G)
		In kind			In inoxidable steels b/ (E)	Total imports (F)	
		Raw or semi manufactured products (B)	Manufactured products (C)	Sub-total (D)			
1953	32	113	132	245	122	367	399
1954	40	307	138	445	171	616	656
1955	38	207	58	265	92	357	395
1956	59	267	28	295	169	464	523
1957	68	500	30	530	171	701	769
1958	73	386	51	437	168	605	678
1959	89	245	63	308	172	480	569
1960	90	491	64	555	262	817	907
1961	90	853	106	959	375	1 334	1 424
1962	125	1 104	88	1 192	315	1 507	1 632
1963	430	567	93	660	433	1 093	1 523
1964 c/	680	610	70	680	340	1 020	1 700

Sources: Economic and Financial Statistics Service of the Ministry of Finance, BNDE and the producers.

a/ Nickel contained in ferro-nickel.

b/ Assuming an average nickel content in inoxidable steels of 5 per cent (NBM class 7).

c/ Preliminary data, subject to revision.

(ii) Extrapolation from the historical trend in consumption. This was based on the hypothesis of an exponential growth in consumption, taking into account not only the form of the apparent curve representing the phenomenon but the typically cumulative nature of the latter. A curve of the type $Y = AB^x$ was, therefore, fitted to the values of column G of table 39, giving the equation $y = 763\ (1{,}146)^x$, by extrapolation of which the figures of column B of table 40 were obtained.

The values projected on this hypothesis are likely to be over-estimates, especially for the last years of the period. Since the data of column A are probably under-estimates, as was explained above, these two series may reasonably be taken as the upper and lower limits of probable nickel consumption during the period.

Table 40

BRAZIL: PROJECTED NICKEL CONSUMPTION IN 1965-1970

(Tons)

Years	Quantities	
	A a/	B b/
1965	1 940	1 980
1966	2 120	2 270
1967	2 310	2 600
1968	2 520	2 940
1969	2 740	3 420
1970	3 000	3 920
1965-1970	14 630	17 170

a/ Based on the ratio between nickel consumption and steel consumption.

b/ $Y = 763 (1,146)^x$.

Pure nickel is still not produced in Brazil. The two enterprises operating in this sector produce the metal only in the form of ferro-nickel,[7] this being more economical when production is on a small scale and uses the situated ores that are all that have so far been discovered in Brazil in sufficient quantities.

It may be noted that the joint production of these two enterprises is about 1,100 tons a year which, being in excess of present domestic needs, is partly exported.

---

[7] Crude or refined ferro-nickel with a nickel content of 26 to 42 per cent.

/4. Motor

4. Motor vehicle industry

The economic development of the country in the post-war period was primarily due to the high growth rate maintained in the secondary sector, combined with the large contribution of that sector to the national product. The domestic development of industry was in turn mainly the result of import substitution, with regard to which the motor vehicle industry provides a characteristic example.

At the end of the Second World War, Brazil possessed very large foreign exchange reserves, with which it was able to make large-scale imports for some time. But so little restraint was exercised that the reserves were exhausted by the end of 1948 and the Government was forced to establish selective import controls. The restrictions on imports applied chiefly to the goods considered to be least essential, one of the most heavily affected items being passenger vehicles. The shortage of such vehicles became constantly more acute, creating a large and unsatisfiable demand.

The need to renew the vehicles inventory and the impossibility of meeting the growing demand by means of imports, from want of foreign exchange, impelled the Government to adopt measures favouring their domestic manufacture. The first administrative act to this effect was the creation of the Executive Committee for the Motor Vehicle Industry, (CEIMA), whose function was to co-ordinate and control the installation of this activity in the country. However, CEIMA never took up its duties and instead the Executive Group for the Motor Vehicle Industry (GEIA), was set up in 1956.

GEIA was composed of representatives of a number of official bodies, and was intended to advise the Government on matters relating to the motor vehicle industry. It was centralized on the administrative and decentralized on the executive plans. Its main task was to co-ordinate the establishment and consolidation of the industry and ensure that use of domestic parts in the vehicles produced increased according to a firmly established schedule.

/Various measures

Various measures were then taken for facilitating and encouraging the establishment of the industry, including the following: authorization to import equipment without exchange coverage, as a direct capital investment; the establishment of preferential exchange rates for parts not manufactured in the country and for loans for use in importing capital goods, with differences, however, for those connected with freight and those connected with passenger vehicles; exemption from customs duties and consumption tax of complementary parts destined for approved programmes; financing of foreign exchange premiums relating to imports of parts, for periods of 1 to 3 years, etc.

Thanks to these incentives the objectives set were fully accomplished. It may be mentioned, however, that before the installation of the assembly industry, Brazil had both factories which partially assembled imported vehicles and enterprises engaged in manufacturing motor vehicle parts. The rapid development that followed from the granting of the incentives took place, therefore, on the basis of an infrastructure already in existence.

Present installed production capacity is about 300,000 units a year and the average domestic parts index over 99 per cent in medium and light vehicles and 94 per cent in heavy vehicles.

The evolution of domestic production in 1957-1964 is shown in table 41.

Table 41

BRAZIL: EVOLUTION OF MOTOR VEHICLE PRODUCTION, 1957-1964

Type	Units produced							
	1957	1958	1959	1960	1961	1962	1963	1964
Motor cars	-	2 189	12 001	37 843	55 065	74 887	86 023	97 768
Medium lorries	15 475	25 713	34 625	35 204	25 352	35 557	20 546	21 023
Heavy lorries and buses	3 372	5 213	5 031	6 495	5 147	4 113	3 478	3 503
Freight vans and mini-buses	2 262	13 692	26 408	34 022	42 492	54 390	50 157	48 490
Station wagons (jeep type)	2 291	14 322	18 178	19 514	17 618	22 247	13 922	12 951
Total	30 700	61 129	96 243	133 078	145 674	191 194	174 126	183 735

Source: Anuários Estatísticos, Brazilian Geographical and Statistical Instituto.

/5. Chemical

5. Chemical industry

As has already been said, Brazil's very rapid industrial development of recent years took the form of substitution of most of the articles that had previously been imported. As a result, new branches and sectors could be established once and for all and the nucleuses of industries essential to the expansion of other sectors created.

The chemical industry gained such impetus in this process, as a result of large fixed capital investments, that it is now of considerable size. Comparison of the physical production growth rates of the chemical industry and industry as a whole will give a clear idea of the extent to which the former has contributed to the industrial development process (see table 42).

Table 42

BRAZIL: GROWTH RATES OF INDUSTRY AS A WHOLE AND THE CHEMICAL INDUSTRY, 1950-1962

(Percentages)

Years	Industry as a whole	Chemical industry
1951-1950	7.3	13.1
1952-1951	4.5	33.3
1953-1952	3.7	-8.7
1954-1953	9.0	19.0
1955-1954	10.1	12.0
1956-1955	6.6	133.9
1957-1956	6.2	33.6
1958-1957	16.2	2.0
1959-1958	12.6	16.8
1960-1959	10.7	2.8
1961-1960	11.1	13.9
1962-1961	5.9	10.0

Source: Getulio Vargas Foundation.

/Its relative

Its relative dynamism and the considerable scale on which it is beginning to operate are further confirmed by the data on apparent consumption of table 43.

Table 43

BRAZIL: APPARENT CONSUMPTION OF CHEMICAL PRODUCTS IN 1959 AND 1963

(Thousand millions of dollars)

Origin	1959	1963
Domestic production	0.53	0.80
Imports	0.10	0.17

It also now has good prospects of an even faster development. The Government Economic Action Programme gives priority to investments in the sector, which can benefit from tax exemptions and be financed by the Federal Government. To enjoy these benefits, projects and investment undertakings must be submitted to the Executive Group for the Chemical Industry for it to study.

The Group is now considering projects for manufacture of the following products: nitrogenous fertilizers, using coking furnace and petroleum gasses (total capacity 1,000 tons of ammonium daily); strene; cyclohexane; acrylonitrile; terephthalic acid; butadiene; anti-knock fluid; sorbitol; phenyl-beta-naphtha lamina; adipic acid; phthalic anhydride; graphite electrodes; polystyrene; polyethylene; phosphoric acid; triple superphosphate; glucose; caustic soda; calcium carbide; soluble cellulose; polyvinyl chloride; natural phosphate; citric acid.

A substantial growth is envisaged in the chemical industry over the next few years, therefore, particularly in the petrochemical branch, where it will be achieved largely through PETROBRAS' five-year investment plan and far-reaching private projects.

/Although the

Although the inorganic chemicals sector is expected to show an adequate growth, its full development pends on the adoption of measures to reduce the prices of salt and electricity, which are its two main inputs.

The recent behaviour and future prospects of certain chemical products will now be considered.

(a) Fertilizers

Consumption of chemical fertilizers in Brazil only recently reached dimensions of any importance, and is still extremely low in comparison with those of other less developed countries whose agricultural production is smaller than Brazil's.

Among the factors which have prevented a faster increase in fertilizer consumption are:

(i) The experimental work, until now carried out in experimental stations that are two few for the diverse conditions of the agricultural regions of the country and whose work programmes suffer from lack of objectivity, has been both poor and insufficient;

(ii) There have been no efficient services for getting farmers to understand the advantages of using fertilizers;

(iii) The high prices of domestic and imported fertilizers, particularly in the last few years, have created an unfavourable relation between fertilizer and agricultural product prices, discouraging more extensive use of fertilizers;

(iv) Transport to consuming regions is often difficult. In most cases road transport has to be used, making the product still more expensive;

(v) Supplies to the consuming markets, which partly depend on imports, tend to be irregular.

Table 44 shows Brazil's apparent consumption of fertilizers in 1950-1964, by sources of supply.

/Table 44

Table 44

BRAZIL: EVOLUTION OF APPARENT CONSUMPTION OF FERTILIZERS IN 1950-1964, BY TYPES

(Tons of pure elements)

Years	Nitrogenous (N)			Phosphate (P_2O_5)			Potassium (K_2O)
	Productions	Imports	Apparent consumption	Productions	Imports	Apparent consumption	Imports
1950	751	13 436	14 187	5 999	44 837	50 836	23 523
1951	760	17 801	18 561	6 450	67 119	73 569	28 709
1952	830	9 775	10 605	8 444	38 479	46 923	15 347
1953	930	19 649	20 579	8 533	56 283	64 816	31 226
1954	1 276	16 486	17 762	12 080	65 309	77 389	28 348
1955	1 223	21 728	22 951	23 842	64 733	88 575	49 523
1956	1 388	28 850	30 238	23 553	70 006	93 559	41 632
1957	1 194	27 364	28 558	41 380	77 309	118 689	60 189
1958	2 578	38 812	41 390	53 478	89 871	143 349	65 082
1959	10 679	34 106	44 785	68 486	55 519	124 005	57 425
1960	15 726	51 034	66 760	77 427	54 164	131 591	106 146
1961	12 021	43 043	55 064	69 766	49 000	118 766	70 727
1962	12 926	37 358	50 284	63 974	55 819	119 793	68 127
1963	13 452	48 609	62 061	44 955	108 430	153 385	91 750

Sources: BNDE (original data from CACEX, Development Council, National Department of Mineral Production, PETROBRAS, National Steel Company, USIMINAS and Economic and Financial Statistics Service).

/The projections

The projections of fertilizer consumption so far prepared have considerably differed among themselves. One of them only has been chosen, therefore, - prepared by the BNDE. Probable fertilizer needs (in agriculture only) were calculated as follows:

Table 45

BRAZIL: ESTIMATED DEMAND FOR FERTILIZERS FOR AGRICULTURAL USE, 1963-1970

(Thousands of tons)

Years	Estimated consumption					
	First hypothesis			Second hypothesis		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
1963 a/	51	153	51	51	153	51
1964	59	177	59	59	177	59
1965	67	201	67	67	201	67
1966	81	243	81	77	231	77
1967	97	291	97	89	267	89
1968	116	348	348	102	306	102
1969	139	417	139	118	354	118
1970	167	501	167	135	405	135

a/ Apparent consumption in agriculture (corrected).

The 1963 apparent consumption was corrected by deducting the quantities used for industrial purposes. The first hypothesis assumes a growth of 15 per cent a year in 1964 and 1965 and 20 per cent a year in 1965-1970. The second assumes a growth of 15 per cent a year cumulative during the whole period. Both may, however, err on the low side, just because fertilizer consumption has so far been so small.

There are good short-term prospects with regard to supply. Since the Federal Government made public the incentives it has granted to the chemical industry, innumerable projects have been submitted to the

Executive Group for the Chemical Industry, whose study of several of importance for nitrogenous fertilizer production is already far advanced. These will jointly provide an additional ammonium capacity of about 1,000 tons a day. With regard to phosphate fertilizers, a number of projects for producing phosphoric acid and, subsequently, triple superphosphate have been considered. These should be carried out during 1966-1970. The prospective exploitation of potassium deposits discovered in the North-East in drilling operations by PETROBRAS opens up new prospects for potassium fertilizers.

(b) Sulphuric acid

Domestic sulphuric acid production, which can be taken as equal to consumption, began in 1910. Table 46 shows the evolution of production in 1957-1964, no figures being available for earlier years.

Table 46

BRAZIL: APPARENT CONSUMPTION OF SULPHURIC ACID,[a] 1957-1964

(Tons)

Years	Production
1957	147 762
1958	175 097
1959	201 832
1960	214 623
1961	230 571
1962	259 319
1963	287 887
1964	300 132

Source: BNDE.

[a] Imports, which amount to less than 1 per cent of consumption (acid for analysis), have not been included.

/There are

There are 14 sulphuric acid producing enterprises in the country, with 21 production units. In most cases the production units are integrated with other factories using the acid as an input; some, however, sell 80 per cent of their production. Their production capacity ranges from 10 to 180 tons a day and total installed capacity is 1,350 tons a day or 456,750 tons a year, for 350 working days. The basic raw material, sulphur, is imported.

Since sulphuric acid is one of the most important chemical products, the evolution of its consumption by sectors may be of interest, as shown in table 47.

Table 47

BRAZIL: SECTORAL CONSUMPTION OF SULPHURIC ACID, 1957-1963

(Percentages)

Years	Super-phosphates	Explosive	Rayon	Metal-lurgy	Inorganic pigments	Chemical products	Miscel-laneous	Total
1957	21.5	11.4	30.5	7.2	3.4	18.7	7.3	100.0
1958	26.0	9.7	25.5	7.7	4.8	16.2	10.1	100.0
1959	33.3	8.3	24.7	7.1	5.3	14.3	7.0	100.0
1960	33.5	7.8	24.2	6.4	5.2	15.7	7.2	100.0
1961	34.3	7.8	23.3	7.5	5.1	16.1	5.9	100.0
1962	34.6	6.6	19.4	7.5	5.3	17.9	8.7	100.0
1963	37.5	6.1	18.4	8.0	4.3	17.4	8.3	100.0

Source: BNDE and producing enterprises.

As can be seen, consumption for superphosphate manufacture has shown a relative increase, that for explosives and rayon a decrease, and that of the other sectors has stayed much the same. The relative increase in consumption for fertilizer manufacture is due to the large expansion of this production as a result of Government incentives to the sector. In future the metallurgy sector will become a large-scale consumer, as a result of the São Paulo Steel Company's (COSIPA) and the Minas Gerais Steelworks' (USIMINAS) production plans.

New projects and expansions of existing installations will increase production capacity to about 660,000 tons a year by 1970. This will be fully adequate for the consumption of that year, which is estimated at about 547,000 tons.

It may be added that sulphuric acid plants are usually installed as parts of other factories, when justified by the latters' use of the acid. In view of this, supply may be expected react promptly to consumer needs.

(c) Sodium carbonate

Brazil has had a large apparent consumption of sodium carbonate for some time, as appears from table 48.

Table 48

BRAZIL: APPARENT CONSUMPTION OF SODIUM CARBONATE, 1952-1964

(Tons)

Years	Sales by the Nat. Alkalis Co. a/	Imports	Apparent consumption	Share of sales in consumption (percentage)
1952	-	40 799	40 799	-
1953	-	56 393	56 393	-
1954	-	93 586	93 516	-
1955	-	51 310	51 310	-
1956	-	87 031	87 031	-
1957	-	74 718	74 718	-
1958	-	74 564	74 564	-
1959	-	84 369	84 369	-
1960	14 800	79 054	93 854	15.8
1961	38 500	60 971	99 471	38.7
1962	75 100	46 415	115 515	65.0
1963	77 400	51 692	105 092	73.6
1964	72 480	6 023	78 503	92.3

Sources: Economic and Financial Statistics Service and BNDE.

a/ Its sales volume consists of its production plus direct imports.

Domestic production began in 1960, when the National Alkalis Company's industrial complex in the State of Rio de Janeiro came into operation. This has an annual production capacity of 100,000 tons, but its equipment was not completely installed till 1961. The evolution of domestic production appears in table 49.

Table 49

BRAZIL: SODIUM CARBONATE PRODUCTION, 1960-1964

(Tons)

Years	Production
1960	16 100
1961	44 300
1962	71 100
1963	76 200
1964	60 400

Sources: BNDE and the National Alkalis Company.

In spite of its drop in 1957-1958, consumption increased by 10 per cent annually in 1959-1962. From 1962 onwards it began, with considerable fluctuations, to decline, partly as a result of the economic slow-down of 1962-1964 and partly of an intensive use of stock-piled imports and of glass broken in glass production. It fell by 9 per cent in 1963 and 25 per cent in 1964.

This pattern of evolution makes it difficult to forecast future demand. But assuming that the growth rate of the economy would recover from 1966 onwards, projections of consumption were prepared on the basis of two hypotheses (cautious and optimistic). These appear in table 50.

/Table 50

Table 50

BRAZIL: PROJECTIONS OF SODIUM CARBONATE CONSUMPTION

(Tons)

Years	Quantities	
	Hypothesis A	Hypothesis B
1965	88 400	109 700
1966	95 000	120 700
1967	104 500	132 700
1968	115 000	146 000
1969	126 400	160 600
1970	139 000	176 600

There would seem to be no problems with regard to supply. The National Alkalis Company aims to have an annual production capacity of 130,000 tons at the beginning of 1966 and of 200,000 tons in 1970 which will in both cases be large enough to meet demand envisaged on the optimistic hypothesis.

(d) Caustic soda

Caustic soda consumption in Brazil, like that of all other chemical products, has undergone a constant increase, as will appear from table 51.

As can be seen, consumption has had an average annual growth of 9 per cent and, since 1958, domestic production's share in total consumption has fluctuated around 40 per cent.

In spite of the constant increase in production capacity, which has been especially rapid since 1957, consumption has been largely supplied by imports, resulting in large foreign exchange expenditure (nearly 13 million dollars a year). In addition, domestic production, all of which uses the electrolytic process, has had to suffer the consequences of the high costs of salt and electric power, its main inputs.

/Table 51

Table 51

BRAZIL: APPARENT CONSUMPTION OF CAUSTIC SODA, 1950-1964

(Thousands of tons)

Year	Production A	Imports B	Consumption C	Percentage share of A in C
1950	8	66	74	11
1951	12	104	116	10
1952	15	48	63	24
1953	20	51	71	28
1954	27	111	138	20
1955	32	69	101	32
1956	47	128	175	27
1957	57	91	148	39
1958	60	88	148	40
1959	64	102	166	39
1960	69	101	170	41
1961	78	102	180	43
1962	85	147	232	37
1963	86	159	245	35
1964	90	117	207	43

Sources: Development Council, BNDE and Economic and Financial Statistics Service.

/There are

There are 13 caustic soda factories in Brazil, of which 6 are integrated with other industrial complexes (mainly for cellulose). Most of them are in the states of Guanabara and São Paulo. In 1964 two factories were inaugurated in the states of Pernambuco and Bahia in the North-East, where 80 per cent of the country's salt is produced and which has relatively cheap electric power. The existing factories have a joint capacity of 480 tons a day.

Consumption projections estimate a volume of about 279,000 tons for 1970. Comparing this figure with that of the envisaged supply (153,000 tons a year plus 65,000 tons from expansion projects which will be finished in 1966), it can be seen that there will continue to be a large deficit on the side of production.

(e) Titanium dioxide

Titanium dioxide consumption grew rapidly during 1953-1964, mainly as a result of the development of the paint pigments industry, of which it is the chief input.

Table 52 shows apparent consumption in the above period by sources of supply, and its growth rate.

It is obvious not only that domestic production has been unable to meet demand, but that there has been practically no increase in manufacturing capacity. There is only one enterprise in the country that makes titanium dioxide, the Industrial Chemicals Company of São Paulo, which produces other articles besides paint pigments. Consequently, the fluctuations in production must be attributed to the internal policy of the enterprise (which itself consumes most of its titanium dioxide production).

In spite of the fluctuations, domestic production grew by 67 per cent in the period under consideration. It may be mentioned that only the anatase form is produced domestically, consumption of the rutile being entirely supplied by imports.

/Table 52

Table 52

BRAZIL: APPARENT CONSUMPTION OF TITANIUM DIOXIDE, 1953-1964

(Tons)

Year	Imports (A)	Production (B)	Apparent consumption (C)	Absolute growth (t)	Relative growth (per cent)	B/A (per cent)
1953	711	947	1 698	2 307	-	58.1
1954	2 887	1 118	4 005	-931	135.9	27.9
1955	1 759	1 315	3 074	850	-20.2	42.8
1956	2 568	1 359	3 927	-400	27.7	34.6
1957	2 473	1 054	3 527	541	-10.2	29.9
1958	2 544	1 524	4 068	518	15.3	37.5
1959	2 771	1 815	4 586	602	12.3	39.6
1960	3 538	1 650	5 188	668	13.1	31.8
1961	4 346	1 510	5 856	1 421	12.9	25.8
1962	5 457	1 820	7 277		24.3	25.0
1963	7 094	1 650 a/	8 744	1 467	20.2	18.9
1964	6 568	1 650 a/	8 218	-526	-6.0	20.1

Sources: BNDE and the Economic and Financial Statistics Service of the Ministry of Finance.

a/ Estimates.

Brazilian imports of the substance have grown enormously during the period, in spite of the changes made in the exchange régime. In 1953, 711 tons were imported and in 1964 6,586 tons. This is due to the fact it is a white pigment which is very difficult to substitute, owing to its high quality rating, and that its consuming sectors have been growing rapidly, particularly during the last ten years.

A recent study by the BNDE's Economic Department on the Brazilian market for titanium dioxide gives estimates of future consumption of the substance, based on the time series for 1953-1963. On the basis of these estimates the 1970 consumption was proyected as 18,660 tons.

However, the Brazilian economy underwent a serious crisis in 1964, resulting in a sharp decline in indultrial activity. Correcting the estimates previously made, the consumption for 1964 and 1965 comes out as 8,218 tons, less than that of 1963. Assuming that in 1966 the economy will recover its former growth rate and that titanium dioxide consumption will then increase at its 1953-1963 average rate, new consumption estimates can be made, that for 1970 being 17,000 tons.

Prospects for domestic supply are encouraging. The Federal Government made titanium dioxide production one of the objects of its Economic Action Programme, regarding it as deserving of fiscal and credit support, this aroused interest in the sector on the part of investors, and several proyects for it have already been passed by the Executive Group for the Chemical Industry (GEIQUIM). As a result, there is a chance that total self-sufficiency will be attained in the next five years; work is to begin in 1966 on a factory which will have an initial production capacity of 10,000 tons/year, with provision for later expansions up to 20,000 tons.

(f) Pulp and paper

(i) Paper. The Brazilian paper industry has developed so rapidly as now to be the most important in Latin America, thanks mainly to the size of its market, which justified the installation of large-scale factories, and the overall economic growth of the last fifteen years.

Table 53 shows the evolution of Brazilian consumption of the different types of paper in 1958-1963. It can be seen that total paper consumption grew by 23 per cent in the period, that is, at an average annual rate of slightly over 4 per cent.

/Table 53

Table 53

BRAZIL: EVOLUTION OF PAPER CONSUMPTION, 1958-1963

(Tons)

Type	1958	1959	1960	1961	1962	1963
Printing paper	269 847.1	270 740.7	293 014.3	268 597.1	262 547.2	271 887.5
Newsprint and for periodicals	204 248.8	212 081.0	230 250.9	211 102.5	198 435.8	199 057.9
Book paper	65 598.3	58 659.1	62 763.4	57 494.6	64 111.4	72 829.6
Writing paper	51 232.3	53 997.2	59 673.4	64 141.1	70 830.2	75 162.4
Packing paper	193 747.5	206 478.5	221 293.5	231 243.3	249 977.4	267 838.2
Kraft	61 155.7	63 513.4	80 752.6	68 895.4	74 713.9	85 017.1
Other types	132 591.8	142 965.1	140 540.9	162 347.9	175 263.5	188 821.1
Other paper n.e.s.	76 198.0	81 074.3	90 390.2	105 098.2	116 271.9	111 792.8
General total	591 024.9	612 290.7	664 371.4	669 019.7	699 626.7	726 680.5

Sources: National Association of Paper Manufacturers, Economic and Financial Statistics Service, and BNDE.

This consumption has been totally supplied by production, except in certain type of printing papers, which are still imported in large quantities, and some of quality and special papers, whose domestic consumption does not yet justify the installation of special units to produce them.

In order to arrive at a suitable technique for projecting future domestic consumption, tha data series on consumption by types were studies and, in view of the recession of 1964, certain corrective factors included in the average growth rates. It was then estimated - taking into account the expected recovery of the earlier economic growth rate in 1966 - that 1966 consumption would be at least equal to that of 1963.

The following growth rates for consumption of the different types of paper were obtained:

- printing paper: 4 per cent annually cumulative for newsprint and periodical paper and 5.6 per cent for book paper;
- writing paper: 8.3 per cent a year, calculated by applying the triennial moving averages and using the method of least squares;
- packing paper: 6 per cent a year for Kraft paper, applying the triennial moving averages; 7.7 per cent a year for other packing papers, applying the triennial moving averages and using the method of least squares;
- others: 10 per cent a year, applying the triennial moving averages and using the method of least squares.

Probable paper consumption in 1966-1970, as shown in table 54, was then determined by application of the above growth rates.

Table 54

BRAZIL: PROJECTED PAPER CONSUMPTION, 1966-1970

(Tons)

Types	1966	1967	1968	1969	1970
Printing paper	273 000	285 090	297 720	310 930	324 750
Newsprint and periodical paper	200 000	208 000	216 320	224 970	233 970
Book paper	73 000	77 090	81 400	85 960	90 780
Writing paper	81 840	88 630	95 990	103 960	112 580
Packing paper	268 000	287 190	307 780	329 850	353 520
Kraft	85 000	90 100	95 510	101 240	107 310
Other types	183 000	197 090	212 270	228 610	246 210
Other paper n.e.s.	124 540	136 990	150 690	165 760	182 340
General total	747 380	797 900	852 180	920 500	973 190

Domestic installed capacity is sufficient to satisfy the consumptions projected, except as regards printing paper and certain types of quality and special paper. The industry works considerably below its nominal production capacity, as appears from table 55.

Table 55

BRAZIL: IDLE CAPACITY IN THE PAPER INDUSTRY, 1958-1963

		300 working days/year		340 working days/year	
Years	Production	Annual production capacity	Idle capacity	Annual production capacity	Idle capacity
		(tons)	(percentage)	(tons)	(percentage)
1958	416 470	504 000	17.4	571 200	27.1
1959	439 900	553 200	20.5	626 960	29.8
1960	474 383	566 700	16.3	642 260	26.1
1961	501 669	668 400	25.0	757 520	33.8
1962	559 573	772 500	27.6	875 500	36.1
1963	594 721	827 400	28.2	937 700	36.6

Sources: National Association of Paper Manufactures and BNDE.

ii) Pulp. As a result of the large growth in consumption, the number and capacity of short- and long-fibre pulp factories has increased rapidly, especially from 1955/56 onwards. Self-sufficiency has now been attained in short-fibre pulp, which is also exported to other Latin American countries. Table 56 shows the evolution of apparent consumption of short-fibre pulp.

/Table 56

Table 56

BRAZIL: APPARENT CONSUMPTION OF SHORT-FIBRE PULP, 1950-1962

Years	Production	Exports	Apparent consumption
1950	2 040	-	2 040
1951	3 830	-	3 830
1952	7 060	-	7 060
1953	8 600	-	8 600
1954	14 600	-	14 600
1955	19 960	-	19 960
1956	24 540	-	24 540
1957	31 170	-	31 170
1958	48 400	-	48 400
1959	63 250	-	63 250
1960	100 010	280	99 730
1961	141 800	2 942	138 858
1962	192 240	4 383	187 857

Sources: BNDE and J. C. Leone e Associados Consultores.

Long-fibre pulp production does not yet wholely satisfy domestic demand, but a rapid advance towards import substitution is being made under current and coming projects, as can be seen in table 57.

/Table 57

Table 57

BRAZIL: APPARENT CONSUMPTION OF LONG-FIBRE PULP, 1950-1963

(Tons)

Years	Production	Exports	Imports	Apparent consumption
1950	44 580	-	111 965	156 545
1951	50 885	-	110 521	161 406
1952	53 075	-	80 264	133 339
1953	59 595	-	87 816	147 411
1954	52 925	-	150 897	203 822
1955	56 750	-	100 191	156 941
1956	60 843	-	116 193	180 036
1957	68 140	-	103 809	171 949
1958	68 210	-	94 437	162 647
1959	75 910	-	88 109	164 019
1960	85 750	-	81 131	166 881
1961	102 780	-	47 382	150 162
1962	135 523	-	43 283	168 806
1963	154 748	-	32 089	186 120

Sources: BNDE and J. C. Leone e Associados Consultores.

When the present projects for expanding of installed units and creating new ones have been carried out, Brazil will be self-sufficient in both long- and short-fibre pulp.

(g) Phthalic plasticizers.

The extraordinary growth in world plastics production since the Second World War has enormously increased plasticizer consumption, particularly that of phthalic plasticizers. In Brasil the installation of the motor vehicle industry stepped up demand for plastics and, consequently, for plasticizers.

/Table 58

Table 58 shows the evolution of apparent consumption of phthalic plasticizers (DOP, DBP and DMP) in Brazil during 1955-1964.

Table 58

BRAZIL: APPARENT CONSUMPTION OF PHTHALIC PLASTICIZERS, 1955-1964

(Tons)

Years	Imports	Production	Apparent consumption	Percentage share of production in consumption
1955	1 299	32	1 331	2.4
1956	1 655	276	1 931	14.3
1957	2 466	392	2 860	13.7
1958	1 765	1 303	3 068	42.5
1959	3 147	732	3 879	18.9
1960	2 063	1 247	3 310	37.7
1961	6 191	1 228	7 419	16.7
1962	5 827	1 609	7 436	21.6
1963	7 998	1 680	9 678	17.4
1964	4 379	4 300 a/	8 679	49.8

Sources: Economic and Financial Statistics Service of the Ministry of Finance and BNDE.

a/ Estimate.

1955 was chosen as the base because in that year plasticizer production and, consequently, large-scale plastics manufacture began in Brazil.

The production figures of table 58 cover only two of the enterprises which have operated in the sector since the other two ceased to engage in this line in 1958 and 1962 respectively, and have not provided information from which their productions could be calculated.

Production increased considerably in 1958 but fell off in 1959. After that year it increased by means of better use of installed capacity. In this connexion the following facts may be noted:

(i) Until 1963 installed capacity was 4,800 tons/year, working 24 hours a day;

(ii) In 1963 production was 1,680 tons or approximately one-third of this installed capacity.

The under-utilization of installed capacity is due to the difficulty of hiring enough technicians to run the factories on a 24 hour basis. Careful quality control has to be carried out, since the product has rigorous purity specifications. Defective processing during the night shifts would make re-processing necessary and thus raise the costs of the end product.

In 1964 a new production unit came into operation. Its installed capacity was 400 tons a month on a 12 hour day and a potential 700 tons on a 24 hour day.

Present installed capacity is, therefore, around 13,200 tons a year.

Some recent calculations of future phthalic plasticizer consumption in Brazil were partly vitiated by the decline in the economic growth rate; but making the necessary corrections it appears that it will be about 22,000 tons in 1968.

As regards supply, there are no known projects at an advanced stage of preparation, but the Federal Government's declared intention of establishing incentives for the sector has aroused interest in it on the part of investors. It may also be remarked that its raw material supplies, especially of octyl alcohol and phthalic anhydryde, will soon be assured, on the completion of a number of plants now under construction.

(h) Agricultural pesticides

Brazil's pesticide consumption has been supplied by massive imports of products whose technical composition and degree of preparation make them available for immediate use and by a few domestically produced products.

/There are

There are two major factors that affect the use of pesticides in Brazil:

(i) Prices. These are liable to be high, owing to the complexity of the manufacturing processes involved and the prospect of making substitutions if intensive technological research is kept up;

(ii) Publicization. The effectiveness of specific chemical pesticides depends on their correct application, which involves proper appreciation of climatic and seasonal factors, etc. and use of suitable equipment.

The firms which marked these products, possess agronomic and chemical equipment and provide constant assistance to farmers. The creation of agricultural co-operatives has done much to spread understanding of pesticides and facilitate their purchase.

Table 59 gives import figures for a selection of the 100 types of agricultural pesticides imported. As can be seen, those of copper sulphate, maneb, DDT and BHC, of traditional use as pesticides, tend to predominate. The products chosen account for about 50 per cent of the total value of pesticide imports, which is roughly 12 million dollars a year.

The only pesticides produced in Brazil are DDT, BHC and parathion (ethyl and methyl). The two main reasons for this are as follows:

(i) The manufacturing patents on these products belong to international firms which operate on a large scale. The intensive research work carried out by them has resulted in the discovery of substitutes for earlier, known products. They normally do not install productive units in other countries unless the country concerned has a good prospective supply of the raw materials used, which is not often the case;

(ii) The domestic market needs time to develop, as well as well-organized and intensive technical assistance, extended by means of trials in farms all over the country.

The products which have good production prospects in Brazil are DDT, BHC and certain chlorine compounds - aldrin, endrin and chlorinated camphene. They possess a reasonable spectrum and are very popular with consumers.

The only obstacle to domestic pesticide production is the cost of raw materials of a petrochemical origin. However, this will be completely eliminated in 1966, when PETROBRAS' petrochemical plant, which will have an annual production capacity of 44,000 tons of benzene, come into operation.

/Table 59

Table 59

BRAZIL: AGRICULTURAL PESTICIDE IMPORTS, 1962-1964

Products	1962		1963		1964	
	1 000 Kg	US$ 1 000	1 000 Kg	US$ 1 000	1 000 Kg	US$ 1 000
DDT	2 550.2	1 139.0	857.2	395.7	2 505.0	1 049.3
BHC	2 562.6	1 089.3	1 969.1	707.4	2 204.7	977.1
Aldrin	1 207.2	1 690.3	760.5	1 127.8	557.4	894.1
Endrin	74.0	336.6	61.9	250.2	180.4	661.6
Maneb	1 062.2	1 647.1	1 125.8	1 869.1	365.0	606.6
Copper sulphate	5 360.2	1 177.2	3 973.9	976.8	1 977.0	536.2
"Meta-Systox"	146.8	410.1	145.8	526.0	145.1	448.2
Methyl bromide	386.0	427.1	626.4	664.1	383.0	374.2
"Trition"	283.0	363.1	178.1	237.4	185.6	261.2
"Sevin"	611.0	1 514.5	-	-	178.5	255.8
Total	14 243.2	9 794.3	9 698.7	6 754.5	8 681.7	6 064.3
Total pesticide imports	21 592.6	15 853.4	18 089.8	12 011.4	15 776.7	11 944.5

Source: Foreign Exchange Portfolio of the Bank of Brazil.

Brazil's present production volumes (1964) are 4,000 tons of DDT, 2,200 of BHC and 600 of parathion. These domestically produced products to compete with foreign equivalents, which can be produced at comparatively low cost. For domestic production to increase it must have low-priced raw materials, and those at present used, being imported, are generally very expensive.

Recently, Dupont of Brazil decided to produce maneb domestically. This is a powerful fungicide of extensive application in agriculture.

As regards consumption, it is obvious that Brazil provided a vast potential market for pesticides. The causes of the present low consumption are as follows:

(i) It depends largely on imports, which involves irregularity of supply and hence an unfavourable pesticide/agricultural product price ratio;

(ii) Farmers have not yet been fully informed of the advantages of more intensive use of pesticides;

(iii) Information is lacking on the types of pesticides that can be used, the seasons to use them and the proper techniques for doing so.

/6. The

6. The ship-building industry

The major impulse to the definitive establishment of a ship-building industry in Brazil was Law 3,381 of 1958, which created a Merchant Navy Fund, a Merchant Navy Renewals Fund, and a Merchant Navy Commission to administer the resources coming from them. The Executive Group for the Ship-building Industry (GEICON) set up later also played a decisive part in the establishment and consolidation of the industry.

Six shipyards - set up with GEICON's approval - are now in regular operation. Table 60 shows the annual production capacity of these.

Table 60

BRAZIL: SHIPYARDS SET UP WITH THE APPROVAL OF THE EXECUTIVE GROUP FOR THE SHIP-BUILDING INDUSTRY

Shipyard	Annual capacity (tons displacement weight)
Ishikawajima	60 000
Cia. Comércio e Navegaçao	25 000
Verolme	40 000
Emaq	8 000
Caneco	2 000
Só	8 000
Total	143 000

Sources: BNDE and Merchant Navy Commission.

Adding the installations of the Rio de Janeiro Navy Yard (10,000 TDW/year), the total capacity of the industry comes to 153,000 TDW/year.

/GEICON laid

GEICON laid down domestic part use indexes for the industry. As volume is not an adequate indicator, value was used, the present level being nearly 92 per cent of the price of the ship. Ship-building is now one of the major sectors of domestic industry. It employs about 15 000 operatives trained by the Rio de Janeiro Navy Yard and the National Industrial Apprenticeship Service (SENAI).

Since it began it has delivered a total of 33 ships (as of September 1965), amounting to nearly 154,000 tons. These totals are analyzed in table 61.

Table 61

BRAZIL: SHIPS DELIVERED BY DOMESTIC SHIPYARDS

(As of September 1965)

Shipyards	Number of ships	Total tonnage
Ishikawajama	9	78 800
Cia. Comércio e Navegaçao	8	31 150
Verolme	3	33 000
Emaq	4	4 480
Caneco	2	1 800
Só	-	-
Rio de Janeiro Naval Arsenal	7	4 792
Total	33	154 022

Sources: BNDE, Economic Department; Merchant Navy Commission.

The largest ship delivered was 12,700 tons TDW. Three cargo boats have been exported to Mexico. In addition to the ships delivered, 14 have been launched and are now being finished. Their total tonnage is 106,640 TDW. Orders to the industry now total 277,000 TDW, and are as shown in table 62.

Table 62

BRAZIL: ORDERS TO THE SHIP-BUILDING INDUSTRY

Type	Units	TDW
Tankers	7	64 100
Grain ships	6	108 000
Cargo boats	14	88 170
Slip-docks	1	11 380 a/
Lighters	10	2 000
Launches	5	3 030
Tugs	2	320

Sources: BNDE, Economic Department; Merchant Navy Commission.

a/ Capacity in metric tons.

7. Machine-tools

Machine-tools are normally classified according to their versatility or productivity as: universal and production machines.

Universal machines have low productivity but can perform a great variety of operations; production machines can perform very few operations (often only one, where a high degree of specialization is possible) but are very productive.

Profitable use of production machines depends essentially on the size of the consumer market. Their use is only justified when demand for the product manufactured is large enough to permit a rapid turnover.

Universal machines, on the other hand, become anti-economic when they are used for a single function which might be better performed by a production machine. Nevertheless, they are preferred for the small-scale serial production that is a prevailing feature of countries with small markets.

It is obvious, therefore, that the composition of any country's machine-tool inventory is strictly related to the size of its market. The larger consumption, the larger the proportion of production machines in the installed inventory.

/Brazil's installed

Brazil's installed inventory shows a relatively low ratio of production to universal machines. Since, therefore, the market for specialized machines is still small, it is to be expected that present production will be confined almost exclusively to universal types.

Domestic production of metalworking machines has developed very rapidly in the last few years.(1963,1964), increasing from 10 thousand tons (9 thousand units) in 1959 to 15 800 tons (15 400 units) in 1964, that is by 58 per cent in weight and 70 per cent in number of units. It is carried out by 120 enterprises, mostly in small factories, since only 14 enterprises employ more than 100 operatives for this activity. 90 per cent of production and 88 per cent of the operatives are concentrated within the State of São Paulo.

In 1964 domestic production, by main types of machines, was as follows:

Table 63

BRAZIL: PRODUCTION OF MACHINE-TOOLS BY MAIN TYPES, 1964

(Tons and units)

Types	Tons	Percentage	Units	Percentage
1. Lathes	5 360	34.0	5 354	34.1
2. Presses	4 254	27.0	2 269	14.8
3. Planers	1 265	8.0	777	5.1
4. Drilling machines	1 003	6.4	4 417	28.7
5. Rectifying machines	434	2.8	492	3.2
6. Bending and similar machines	427	2.7	299	1.9
7. Milling machines	290	1.8	240	1.6
8. Sawing machines	231	1.5	864	5.6
9. Metalworking machines n.e.s.	2 514	15.8	769	5.0
Total	15 778	100.0	15 370	100.0

Source: BNDE, Economic Department.

Consumption, after reaching abnormally high levels in 1959-1960 as a result of the consolidation of an industrial complex whose installation had begun in earlier years, fell to 19,300 tons in 1961 and since then has only grown by an average of 2 per cent a year (in weight).

The composition of consumption, by origin of machines, has been as follows:

(a) In 1959-1960 apparent consumption was 47,800 tons, with an estimated value of 82,300,000 dollars; domestic production accounted for 45 per cent by weight and 30 per cent by value, indicating that the average prices of domestic machines are lower than those of imported machines which are of better quality and higher productivity. The unit weight of the machines imported was 3.6 tons per unit, while that of domestic machines was 1.1 tons per unit.

(b) During 1961-1964 consumption fell to an average 20,500 tons a year, or 85 per cent of the annual average of the preceding two years. This decrese occurred at the expense of imports, which fell to an annual average of 5,000 tons (1,560 units) and 11,600,000 dollars, as against 13,200 tons (3,700 units) and 26,000,000 dollars in 1959-1960. Domestic production's share rose to 65 per cent by weight and 60 per cent by value, which however, was not due to any major improvements in its quality but reflected a reduction in the volume of highly specialized machines added to the industrial inventory in this period.

Exports of machine-tools began to be of significance only in 1962, when they passed 100 thousand dollars in value. Since then they have expanded rapidly, reaching 1 million dollars in 1964. Lathes are by far the most important component of these exports (89.8 per cent of their value in 1964), since it is in this branch that Brazilian industry has become most perfect.

The exports are mainly to LAFTA countries, and are likely to increase as new concessions are granted. In view of the position already reached by Brazil in this respect it may be hoped that, as its machine-tool industry progresses, it will become the main supplier of Latin America.

The tables in the statistical annex give fuller information on the machines added to the industrial inventory during 1959-1964.

/VI. EXTERNAL

VI. EXTERNAL DEVELOPMENT FINANCING

As a rule the internal resources of the developing countries are not by themselves enough for the investments needed to attain specific growth rates and a desirable rhythm of structural transformation. These must, therefore, partly be financed with external resources, the proportion varying with the stage of development of the country concerned.

As best these countries could only achieve a capacity for rapid mobilization of internal resources in quantities sufficient for the investments needed to maintain a high rate of development by imposing compulsory savings régimes, which would further reduce their already small capacity to consume and thus probably deter their potential investors.

On the other hand, their small capacity to import means that they do not have the foreign exchange that they need, in increasing quantities, in order to import essential capital goods and materials. The level of these imports can only be maintained by deferring their payment to the medium- and long-term. This is done by means of loans from the suppliers, foreign (public or private) finance agencies, and international organizations.

External financing is thus of special importance to these countries, either as an additional source of resources or as the means of maintaining the inflow of imports essential to their development.

Table 64 shows the amounts of external financing of the Brazilian economy during 1954-1964. The private capital inflow was greatest between 1957 and 1961, precisely the period in which the highest rates of development were achieved. This inflow was partly due to the privileges then granted to certain branches of industry, which increased the profits on a whole series of foreign investments.

In connexion with this table it may be remarked that the autonomous capital (public and private) obtained was less than what was needed, as is proved by the amount of the regularization operations which had to be carried almost throughout the period in order to cover the current account deficit in the balance of payments.

/Table 64

Table 64

BRAZIL: EXTERNAL FINANCING IN 1954-1964

(Millions of dollars)

Year	Private capital			Public capital		Total
	Investments (A)	Reinvestments (B)	Loans and other financing (C)	Investments (D)	Regularization (E)	(F)
1954	11	40	32	77	200	360
1955	43	36	24	60	61	224
1956	89	50	131	100	-28	342
1957	143	35	211	108	37	534
1958	110	18	223	150	195	696
1959	124	34	291	148	-21	576
1960	99	39	217	130	58	543
1961	108	39	346	183	310	986
1962	69	67	178	165	120	599
1963	30	57	93	169	188	537
1964	30	-	215		88	333

Source: Central Bank of Brazil.

The following table shows the percentage distribution of the investments in Brazil made by foreigners between 16 December 1957 and 31 December 1963, according to the registers of the former Superintendency of Currency and Credit, now the Central Bank.

Table 65

BRAZIL: FOREIGN CAPITAL INVESTMENTS IN THE COUNTRY BETWEEN 16 DECEMBER 1957 AND 31 DECEMBER 1963, BY TYPES OF INDUSTRY

Types of industry	Percentage
I. Basic industries	
A. Iron and steel	2.3
B. Non-ferrous metallurgy	2.6
C. Heavy mechanical and electrical industries	5.6
D. Motor vehicles and their parts	44.6
E. Mining	1.2
F. Basic chemicals and petrochemicals	8.4
G. Cement	1.1
H. Ship-building	2.7
I. Tractors, their parts and attachments	5.2
Sub-total	73.7
II. Light industries	
A. Textiles	3.5
B. Food products	2.4
C. Light chemicals and pharmaceutical products	3.6
D. Ceramics	0.1
E. Light mechanical and electrical industries	9.2
F. Vegetable oils	0.5
G. Miscellaneous	7.0
Sub-total	26.3
Total	100.0

Source: Central Bank of Brazil.

The share absorbed by the motor vehicle and motor parts industry - nearly 45 per cent - is particularly striking.

/STATISTICAL ANNEX

STATISTICAL ANNEX

Table I-A

BRAZIL: ANNUAL INFLOW OF NEW MACHINE-TOOLS INTO THE MACHINERY INVENTORY, 1959-1964

(Tons)

Major groups of machinery	1959		1960		1961		1962		1963		1964	
	Apparent consumption (t) 1	Percent of liquid production in consumption a/ 2	Apparent consumption (t) 3	Percent of liquid production in consumption 4	Apparent consumption (t) 5	Percent of liquid production in consumption 6	Apparent consumption (t) 7	Percent of liquid production in consumption 8	Apparent consumption (t) 9	Percent of liquid production in consumption 10	Apparent consumption (t) 11	Percent of liquid production in consumption 12
A. Cutting machines	12 455	47.7	17 980	40.1	13 151	67.4	14 308	72.1	14 209	75.0	14 734	66.9
1. Lathes	4 954	65.0	6 052	65.4	5 310	84.8	6 027	88.5	5 835	89.0	5 598	84.6
2. Milling machines	1 248	9.1	1 901	6.6	1 017	20.0	1 298	27.0	1 286	20.7	1 117	25.2
3. Planers	1 237	85.1	2 047	66.5	2 003	73.3	1 826	90.9	1 882	87.6	2 016	59.9
4. Drilling machines b/	1 839	29.7	2 851	18.3	1 666	45.9	1 761	55.7	1 649	61.6	2 303	43.4
5. Rectifying machines c/	1 228	3.0	1 869	7.4	985	32.9	1 030	33.2	1 089	34.4	1 223	35.5
6. Saving machines	183	59.0	154	44.2	291	75.3	306	86.3	317	80.8	277	82.3
7. Cutting machines n.e.s. d/	1 766	48.8	3 106	34.8	1 879	73.6	2 060	66.8	2 157	88.6	2 200	89.2
B. Forming machines	8 487	47.4	8 867	50.6	6 154	90.6	6 461	85.7	6 930	80.6	5 965	87.3
1. Presses	5 619	59.8	5 957	62.8	4 563	96.6	4 589	96.7	5 127	88.6	4 627	91.8
2. Bending and similar machines	730	54.9	1 742	23.7	696	71.6	896	52.0	552	81.3	571	74.8
3. Forming machines n.e.s. e/	2 138	12.1	1 168	28.3	895	74.7	976	63.8	1 251	47.2	767	69.9
Total (A + B)	20 942	47.6	26 847	43.6	19 305	74.8	20 769	76.3	21 139	76.9	20 699	72.8

Sources: Foreign Trade Portfolio and BNDE, Economic Department.

a/ Liquid production=domestic production minus exports.

b/ Including boring machines, gang drills, co-ordinate drills and broaching machines, as well as drills proper.

c/ Including honing machines, polishing machines, emery grinders and sanders.

d/ Mostly manual cutters, shears and screw-cutting machines.

e/ Including forging hammers.

Table II-A

BRAZIL: IMPORTS OF MACHINE-TOOLS BY MAIN TYPES OA MODELS OF THE TARIFF NOMENCLATURE CLASSIFICATION, 1959-1964

Machine tools	Tariff nomen-clature	1959		1960		1961		1962		1963		1964	
		Units	Tons	Units	Tons	Units	Tons	Units	Tons	Units	Tons	Units	Tons
A. Cutting machines													
1. Universal engine lathes weighing up to 4,000 kg	84-64-001	27	44.0	73	157.3	35	30.1	48	64.7	54	78.4	10	3.8
2. Universal engine lathes weighing over 4,000 kg	002	4	55.1	8	60.4	3	31.1	8	44.2	3	19.1	-	-
3. Specifically automatic lathes	003	230	547.8	258	574.3	149	207.7	149	201.4	187	274.9	61	92.2
4. Specifically copying lathes	004	34	34.0	58	237.0	12	20.7	16	26.8	12	32.6	17	53.0
5. All other lathes weighing up to 3,000 kg	005	326	593.0	144	201.0	30	32.3	45	44.8	49	50.5	28	48.5
6. All other lathes weighing over 3,000 kg	006	78	460.3	132	867.0	23	485.6	37	309.5	19	184.5	27	662.2
7. Automatic milling-cutters	007	75	276.2	104	453.9	38	252.3	48	419.3	65	252.6	49	265.1
8. Other milling-cutters	008	293	857.3	400	1 321.8	243	561.3	230	528.7	269	767.9	159	570.2
9. Shapers weighing up to 500 kg	009	-	-	-	-	-	-	-	-	1	0.3	-	-
10. Shapers weighing over 500 kg	010	10	17.6	46	99.3	8	13.8	9	16.8	8	28.0	7	16.5
11. Metal planes with swinging table	011	2	4.3	3	6.5	1	0.8	1	0.1	-	-	-	-
12. Metal planes with simple travelling table weighing up to 2,000 kg	012	1	0.7	-	-	1	0.1	2	1.9	-	-	-	-
13. Metal planes with simple travelling table weighing over 2,000 kg	013	9	149.9	9	127.1	4	185.4	5	86.4	12	144.6	7	351.4
14. All other planes weighing up to 2,000 kg	014	2	3.4	6	7.8	3	4.0	2	1.9	2	2.4	3	3.7
15. All other planes weighing over 2,000 kg	015	9	108.2	98	444.9	7	331.3	4	59.8	6	58.3	13	236.9
16. Threading machines	016	1	1.7	3	18.0	12	10.6	4	1.3	2	1.1	-	-
17. Radial drills weighing up to 2,000 kg	017	99	50.1	41	55.9	41	62.1	23	33.4	33	40.6	13	14.3
18. Radial drills weighing over 2,000 kg	018	85	327.9	111	449.9	76	274.2	39	197.4	54	227.1	81	357.9
19. Bench drills, except radial, of up to 1,000 kg	020	29	8.3	42	9.6	14	2.3	6	1.4	29	2.5	4	0.7
20. Bench drills, except radial, of over 1,000 kg	021	6	48.8	14	50.7	2	18.0	3	14.6	1	7.4	2	4.2
21. All other drills weighing up to 1,000 kg	022	87	44.5	113	47.0	17	7.6	22	10.6	11	3.6	11	4.5
22. All other drills weighing over 1,000 kg	023	194	813.8	306	1 715.1	103	537.5	97	522.9	77	349.5	113	921.7
23. Automatic screw-cutting machines	024	54	31.6	54	64.5	55	30.3	54	26.5	32	15.4	22	14.3
24. Other screw-cutting machines	025	30	22.0	44	71.1	26	20.2	41	89.7	26	24.0	12	31.4
25. Metal-cutting slitting or circular saws	027	29	32.5	66	44.1	42	46.0	43	25.3	50	38.1	19	17.0
26. Metal-cutting belt saws	029	18	10.6	18	13.5	4	4.0	6	6.6	2	1.2	4	3.3
27. Saws or cutters n.e.s.	035	10	31.8	49	28.2	14	11.7	6	10.3	15	21.3	12	27.5
28. Emery grinders or honing machines of up to 500 kg	036	65	8.6	87	10.2	72	10.5	41	8.2	55	7.9	48	5.8
29. Emery grinders or honing machines of over 500 kg	037	55	102.5	70	183.2	26	71.5	46	64.3	25	24.0	50	183.2
30. Rectifying machines	038	448	1 058.9	666	1 498.9	316	571.5	349	578.3	385	665.2	245	581.7
31. Bench-type polishers and sanders of up to 500 kg	039	22	8.2	20	3.5	3	0.8	7	1.0	2	0.4	8	2.6
32. Bench-type polishers and sanders of over 500 kg	040	13	12.4	25	35.8	4	5.8	6	37.2	7	16.7	2	15.5
33. Manual shears for cutting material at least 10 mm thick and 2 m long	041	28	102.0	13	96.4	11	119.8	5	54.5	3	5.0	1	71.5
34. Cutting machines n.e.s.	042	267	747.6	837	1 894.0	84	315.7	119	511.2	96	199.6	29	118.5
Sub-total	-	2 580	6 615.6	3 858	10 847.9	1 479	4 276.6	1 521	4 001.0	1 592	3 544.7	1 057	4679.1
B. Forming machines													
35. For curring, straightening and similar operations of up to 9,000 kg	84-65-001	117	168.7	221	230.5	76	51.7	76	85.5	28	35.2	17	34.0
36. For curring, straightening and similar operations of over 9,000 kg	002	8	160.5	19	1 099.6	7	146.3	21	344.9	3	67.6	7	127.2
37. Forging machines and hammers	003	23	993.5	41	415.8	9	90.6	17	206.8	18	562.9	14	107.5
38. Stamping machines weighing up to 5,000 kg	004	106	119.4	52	95.0	20	39.1	19	23.0	23	30.6	13	19.6
39. Stamping machines weighing over 5,000 kg	005	44	2 138.5	27	2 120.6	7	114.5	7	120.9	19	550.9	5	360.3
40. Wire drawing machines	006	29	55.8	28	41.5	19	102.1	17	62.8	4	15.6	46	45.7
41. Forming machines n.e.s.	007	46	829.7	201	980.3	14	33.4	41	82.9	14	81.2	10	77.4
Sub-total	-	364	4 466.1	589	4 983.3	152	577.7	198	926.8	109	1 944.0	112	771.7
Total	-	2 944	11 081.7	4 447	15 231.2	1 631	4 854.3	1 719	4 927.8	1 701	4 888.7	1 169	5 450.8

Source: Basic data of the Foreign Trade Portfolio.

Table III-A

BRAZIL: PRODUCTION OF MACHINE-TOOLS BY MAIN TYPES, 1959-1964

(Units and tons)

Machine-tools	1959		1960		1961		1962		1963		1964a/	
	Units	Tons	Units	Tons	Units	Tons	Units	Tons	Units	Tons	Units	Tons
A. Cutting machines	7 051	5 950	8 589	7 258	11 130	8 923	13 445	10 471	13 089	11 062	12 668	10 561
1. Lathes	3 166	3 225	3 866	3 972	3 896	4 553	5 134	5 486	5 116	5 581	5 243	5 360
2. Milling machines	59	113	154	125	212	203	344	350	279	273	240	290
3. Planers	574	1 053	835	1 361	925	1 468	1 070	1 661	857	1 649	777	1 265
4. Drilling machines b/	2 452	546	2 752	523	4 379	764	4 972	981	4 749	1 012	4 417	1 003
5. Rectifying machines c/	60	37	203	141	412	324	461	352	468	375	492	434
6. Sawing machines	477	108	385	68	859	219	925	264	1 024	261	864	231
7. Cutting machines n.e.s. d/	263	868	394	1 068	447	1 392	539	1 377	596	1 911	635	1 978
B. Forming machines	1 971	4 021	2 316	4 493	2 759	5 576	2 895	5 561	2 828	5 585	2 702	5 217
8. Presses	1 618	3 361	1 930	3 741	2 273	4 409	2 424	4 462	2 360	4 545	2 269	4 254
9. Bending and similar machines	294	401	305	412	337	498	313	466	309	449	299	427
10. Forming machines n.e.s. e/	59	259	81	340	149	669	158	633	159	591	134	536
Total (A + B)	9 022	9 971	10 905	11 751	13 889	14 499	16 340	16 032	15 917	16 647	15 370	15 778

Source: BNDE, Economic Department.

a/ Preliminary data, subject to revision.

b/ Including boring machines, jig drills, co-ordinate drills and broaching machines, as well as drills proper.

c/ Including honing machines, polishing machines, emery grinders and sanders.

d/ Mostly manual cutters, shears and screw-cutting machines.

e/ Including forging hammers.

Table I-8

BRAZIL: ANNUAL INFLOW OF NEW MACHINE-TOOLS INTO THE MACHINERY INVENTORY, 1959-1964

(In value)

Major groups of machinery	1959		1960		1961		1962		1963			
	Apparent consumption (thousands of dollars)	Percent of liquid production in consumption a/	Apparent consumption (thousands of dollars)	Percent of liquid production in consumption	Apparent consumption (thousands of dollars)	Percent of liquid production in consumption	Apparent consumption (thousands of dollars)	Percent of liquid production in consumption	Apparent consumption (thousands of dollars)	Percent of liquid production in consumption	Apparent consumption (thousands of dollars)	Percent of liquid production in consumption
A. Cutting machines	23 928	30.0	39 944	22.4	19 851	54.8	22 859	56.1	22 951	56.3	23 514	51.2
1. Lathes	9 458	47.7	11 916	46.5	8 067	78.1	9 350	79.9	9 516	76.4	8 465	78.4
2. Milling machines	2 847	7.9	5 652	4.4	2 158	18.8	3 128	22.4	3 450	15.4	3 088	18.3
3. Planers	1 437	73.3	2 850	47.8	2 134	68.8	1 947	85.2	2 049	79.8	1 880	64.3
4. Drilling machines b/	3 680	14.8	5 667	9.2	2 424	31.5	2 583	38.0	2 218	45.6	4 153	31.7
5. Rectifying machines c/	3 199	2.2	5 061	5.4	2 576	24.8	2 732	24.9	3 016	24.1	3 372	25.1
6. Sawing machines	272	31.6	246	22.0	290	60.3	311	67.8	342	59.9	289	63.0
7. Cutting machines n.e.s. d/	3 035	22.9	7 952	10.9	2 202	51.0	2 808	40.4	2 360	65.5	2 267	71.2
B. Forming machines	9 082	43.4	9 913	44.3	6 510	83.7	6 594	82.2	7 455	73.2	6 545	77.9
1. Presses	6 088	55.2	6 544	57.2	4 749	92.8	4 584	97.0	5 433	83.5	4 875	87.1
2. Bending and similar machines	1 013	31.7	1 788	18.5	680	58.5	846	44.1	548	65.5	696	49.1
3. Forming machines n.e.s. e/	1 981	13.0	1 581	20.0	1 081	60.0	1 164	51.8	1 474	38.0	974	52.4
Total (A + B)	33 010	33.7	49 257	26.8	26 361	61.9	29 453	62.0	30 406	60.5	30 059	57.0

Sources: Foreign Trade Portfolio and BNDE, Economic Department.

a/ Liquid production = domestic production minus exports.
b/ Including boring machines, gang drills, co-ordinate drills and broaching machines, as well as drills proper.
c/ Including honing machines, polishing machines, emery grinders and sanders.
d/ Mostly manual cutters, shears and [illegible]-cutting machines.
e/ Including forging hammers.

Table II-B

BRAZIL: IMPORTS OF MACHINE-TOOLS BY MAIN TYPES OR MODELS OF THE TARIF NOMENCLATURE CLASSIFICATION, 1959-1964

(Average weights in kilogrammes/unit and average prices in dollars/unit) a/

Machine-tools	Tarriff nomen-clature	1959		1960		1961		1962		1963		1964	
		Average weights (kg)	Average prices (US$/kg)	Average weights (kg)	Average prices (US$/kg)	Average weights (kg)	Average prices (US$/kg)	Average weights (kg)	Average prices (US$/kg)	Average weights (kg)	Average prices (US$/kg)	Average weights (kg)	Average prices (US$/kg)
A. **Cutting machines**													
1. Universal engine lathes weighing up to 4 000 kg	84-64-001	1 630	2.1	2 155	1.9	860	1.8	1 349	1.7	1 451	2.0	385	3.6
2. Universal engine lathes weighing over 4 000 kg	002	13 773	2.5	7 550	1.7	10 357	1.2	5 522	1.5	6 382	2.5	-	-
3. Specifically automatic lathes	003	2 382	3.3	2 226	4.1	1 394	2.7	1 353	3.7	1 470	4.5	1 512	4.4
4. Specifically copying lathes	004	1 008	3.0	4 087	3.2	1 726	4.2	1 676	3.4	2 716	4.4	3 120	3.7
5. All other lathes weighing up to 3 000 kg	005	1 819	3.0	1 396	3.3	1 078	2.8	995	3.4	1 031	3.1	1 731	3.2
6. All other lathes weighing over 3 000 kg	006	5 902	2.2	6 568	2.5	21 111	1.9	8 964	2.3	9 710	2.7	24 526	1.6
7. Automatic milling-cutters	007	3 689	2.7	4 364	3.6	6 639	2.4	8 735	2.6	3 885	2.8	5 411	3.8
8. Other milling-cutters	008	2 926	2.2	3 305	2.8	2 310	2.1	2 299	2.6	2 855	2.9	3 586	2.7
9. Shapers weighing up to 500 kg	009	-	-	-	-	-	-	-	-	900	0.5	-	-
10. Shapers weighing over 500 kg	010	1 759	1.6	2 158	3.2	1 721	2.5	1 869	2.4	3 497	2.2	2 360	2.8
11. Metal planes with swinging table	011	2 150	0.9	2 170	1.5	750	5.7	95	7.4	-	-	-	-
12. Metal planes with simple travelling table weighing up to 2 000 kg	012	725	1.5	-	-	118	30.9	971	4.3	-	-	-	-
13. Metal planes with simple travelling table weighing over 2 000 kg	013	16 656	1.2	14 112	1.5	46 956	1.5	17 284	1.3	12 047	1.6	50 200	0.8
14. All other planes weighing up to 2 000 kg	014	1 660	1.2	1 303	1.6	1 333	4.9	961	5.7	1 180	1.9	1 233	2.0
15. All other planes weighing over 2 000 kg	015	12 018	1.6	11 709	2.1	47 333	1.0	14 953	1.9	9 722	2.0	18 219	1.4
16. Threading machines	016	1 727	2.9	6 017	3.3	885	2.2	320	4.6	549	7.0	-	-
17. Radial drills weighing up to 2 000 kg	017	1 285	1.8	1 364	1.6	1 515	1.4	1 451	1.3	1 230	1.6	1 096	1.6
18. Radial drills weighing over 2 000 kg	018	3 858	1.4	4 053	1.5	3 608	1.1	5 062	1.6	4 205	1.6	4 419	1.3
19. Bench drills, except radial, of up to 1 000 kg	020	285	4.0	228	3.1	166	2.9	226	3.3	85	6.5	172	2.5
20. Bench drills, except radial, of over 1 000 kg	021	8 130	1.5	3 622	2.2	9 000	2.1	4 852	2.8	7 400	3.1	2 107	2.0
21. All other drills weighing up to 1 000 kg	022	372	2.7	417	2.7	444	2.4	482	3.6	323	4.3	407	6.1
22. All other drills weighing over 1 000 kg	023	4 195	2.9	5 605	2.4	5 219	2.2	5 391	2.2	4 539	2.1	8 156	2.8
23. Automatic screw-cutting machines	024	586	2.6	1 195	3.6	552	2.1	491	2.0	480	4.0	2 648	4.0
24. Other screw-cutting machines	025	733	2.4	1 616	2.7	774	2.5	2 187	4.0	926	2.8	2 615	4.7
25. Metal-cutting slitting or circular saws	027	1 119	2.2	668	2.0	1 695	1.7	5 879	2.2	762	2.9	893	1.9
26. Metal-cutting belt saws	029	590	2.3	748	2.1	1 007	3.9	1 104	3.1	585	3.6	825	3.0
27. Saws or cutters n. e. s.	035	3 182	2.9	576	2.6	892	1.8	1 724	2.3	1 420	2.7	2 291	2.4
28. Emery grinders or honing machines of up to 500 kg	036	133	3.6	118	4.8	146	2.4	199	5.6	144	5.7	120	7.5
29. Emery grinders or honing machines of over 500 kg	037	1 864	3.3	2 617	2.6	2 749	3.6	1 398	3.2	965	5.0	3 666	3.7
30. Rectifying machines	038	2 364	2.6	2 251	2.8	1 809	2.9	1 657	3.0	1 728	3.1	2 374	3.0
31. Bench-type polishers and sanders of up to 500 kg	039	375	2.4	175	1.5	277	1.1	147	3.8	188	5.8	331	4.5
32. Bench-type polishers and sanders of over 500 kg	040	957	2.8	1 433	3.2	1 457	2.9	6 195	1.3	2 379	2.3	7 750	2.2
33. Manual shears for cutting material at least 10 mm thick and 2 m long	041	3 643	0.7	7 419	1.1	10 888	0.8	10 903	0.6	1 705	1.9	71 500	1.5
34. Cutting machines n. e. s.	042	2 800	2.8	2 263	3.4	3 758	2.7	4 295	2.4	2 079	3.3	4 087	2.9
Sub-total	-	2 564	2.5	2 812	2.8	2 892	2.1	2 630	2.5	2 287	2.8	4 428	2.5
B. **Forming machines**													
35. For curving, straightening and similar operations of up to 9 000 kg	84-65-001	1 442	2.8	1 043	1.7	680	2.6	1 125	1.8	1 259	2.6	2 000	3.1
36. For curving, straightening and similar operations of over 9 000 kg	002	20 065	1.4	54 874	1.0	20 897	1.0	16 426	0.9	22 487	1.5	18 173	2.0
37. Forging machines and hammers	003	43 194	0.9	10 141	1.1	10 057	0.8	12 166	0.8	31 272	1.2	7 680	1.4
38. Stamping machines weighing up to 5 000 kg	004	1 127	2.1	1 827	2.1	1 955	2.7	1 212	2.7	1 332	2.4	1 506	1.9
39. Stamping machines weighing over 5 000 kg	005	48 603	1.2	78 539	1.2	16 363	2.1	17 269	1.0	28 997	1.5	72 058	1.5
40. Wire drawing machines	006	2 788	2.5	1 482	3.4	5 374	3.1	3 691	2.9	3 893	3.8	994	2.5
41. Forming machines n. e. s.	007	18 037	0.8	1 892	1.6	2 388	1.4	2 022	2.5	5 801	2.4	7 745	2.1
Sub-total	-	12 296	1.2	7 442	1.3	3 601	1.8	4 681	1.1	12 321	1.5	6 890	1.9
Total	-	3 764	2.0	3 425	2.4	2 976	2.1	2 867	2.3	2 874	2.5	4 663	2.4

Source: Basic data of the Foreign Trade [illegible]

a/ f.o.b. value in dollars.

Table III-B

BRAZIL: ESTIMATED VALUE OF DOMESTIC PRODUCTION OF MACHINE-TOOLS BY MAIN TYPES, 1959-1964

(In thousands of dollars)

Machine-tools	1959	1960	1961	1962	1963	1964 a/
A. Cutting machines	7 202	8 913	10 959	13 080	13 637	13 050
1. Lathes	4 517	5 554	6 375	7 693	7 946	7 542
2. Milling machines	226	250	406	700	553	566
3. Planers	1 053	1 361	1 468	1 681	1 637	1 261
4. Drilling machines b/	546	523	764	981	1 013	1 005
5. Rectifying machines c/	70	271	638	679	728	850
6. Sawing machines	86	54	175	211	213	185
7. Cutting machines n.e.s. d/	704	900	1 133	1 135	1 547	1 641
B. Forming machines	3 939	4 387	5 452	5 448	5 460	5 106
8. Presses	3 361	3 741	4 409	4 462	4 538	4 254
9. Bending and similar machines	321	330	398	373	359	342
10. Forming machines n.e.s. e/	257	316	645	613	563	510
Total (A + B)	11 141	13 300	16 411	18 528	19 097	18 156

Source: BNDE, Economic Department.

a/ Preliminary data, subject to revision.

b/ Including boring machines, gang drills, co-ordinate drills and broaching machines, as well as drills proper.

c/ Including honing machines, polishing machines, emery grinders and sanders.

d/ Mostly manual cutters, shears and screw-cutting machines.

e/ Including forging hammers.

Table IV

BRAZIL: EXPORTS OF MACHINE-TOOLS BY MAIN TYPES, 1959-1964

(Units, weights in tons and values in thousands of dollars)

Machine-tools	Years											
	1959-61 a/			1962			1963			1964		
	Units	Weight (tons)	Value	Units	Weight (tons)	Value	Units	Weight (tons)	Value	Units	Weight (tons)	Value
1. Lathes	...	68.0	97.2	110	149.5	223.1	281	385.7	672.6	508	622.0	908.6
2. Others b/	...	34.4	51.7	5	28.4	46.5	15	16.8	17.7	103	92.0	102.7
Total	...	102.4	148.9	115	177.9	269.6	296	402.5	690.3	611	714.0	1 011.3

Source: For 1959-61, Economic and Financial Statistics Service; for 1962-64, Foreign Trade Portfolio.

a/ The data for 1959-61 refer to the whole period; the weights are net and the values f.o.b.

b/ Including all types of machine-tools. Specifications were avoided in order to prevent the enterprises concerned from being identified, since some exports consisted of a single unit.

Table II-C

BRAZIL: IMPORTS OF MACHINE-TOOLS BY MAIN TYPES OR MODELS OF THE TARIFF NOMENCLATURE CLASSIFICATION, 1959-1964

(Values in thousands of dollars) a/

Machine-tools	Tarriff nomenclature	1959	1960	1961	1962	1963	1964
A. Cutting machines							
1. Universal engine lathes weighing up to 4,000 kg	84-64-001	91.2	302.7	59.4	110.8	156.8	14.0
2. Universal engine lathes weighing over 4,000 kg	002	136.7	99.8	38.1	67.6	47.7	-
3. Specifically automatic lathes	003	1 781.6	2 337.3	562.4	749.4	1 239.5	403.1
4. Specifically copying lathes	004	101.6	768.6	86.6	92.3	144.9	197.3
5. All other lathes weighing up to 3,000 kg	005	1 805.1	671.5	89.3	154.5	156.7	154.3
6. All other lathes weighing over 3,000 kg	006	1 007.9	2 198.9	994.6	705.1	497.0	1 067.8
7. Automatic milling-cutters	007	757.6	1 649.5	593.8	1 069.1	715.0	1 005.3
8. Other milling-cutters	008	1 863.4	3 752.6	1 158.4	1 358.6	2 203.1	1 518.9
9. Shapers weighing up to 500 kg	009	-	-	-	-	0.2	-
10. Shapers weighing over 500 kg	010	27.8	317.4	34.8	40.0	61.0	46.2
11. Metal planes with swinging table	011	3.9	9.8	4.3	0.7	-	-
12. Metal planes with simple travelling table weighing up to 2,000 kg	012	1.1	-	3.6	8.3	-	-
13. Metal planes with simple travelling table weighing over 2,000 kg	013	173.3	192.9	277.4	115.7	234.5	278.6
14. All other planes weighing up to 2,000 kg	014	3.9	12.6	19.7	10.9	4.4	7.5
15. All other planes weighing over 2,000 kg	015	174.2	956.0	325.7	112.6	112.8	339.6
16. Threading machines	016	5.0	58.8	23.1	5.9	7.7	-
17. Radial drills weighing up to 2,000 kg	017	89.0	86.9	84.1	44.5	65.4	22.2
18. Radial drills weighing over 2,000 kg	018	462.0	689.5	308.2	308.7	362.4	275.4
19. Bench drills, except radial, of up to 1,000 kg	020	33.3	29.5	6.7	4.5	15.8	1.8
20. Bench drills, except radial, of over 1,000 kg	021	72.3	110.5	38.3	41.1	23.2	8.5
21. All other drills weighing up to 1,000 kg	022	119.5	126.0	26.0	38.0	15.2	27.2
22. All other drills weighing over 1,000 kg	023	2 357.6	4 101.3	1 196.4	1 165.4	724.3	2 618.1
23. Automatic screw-cutting machines	024	83.4	229.4	65.0	54.1	61.3	56.8
24. Other screw-cutting machines	025	51.9	195.3	50.3	360.7	67.7	147.9
25. Metal-cutting slitting or circular saws	027	69.9	89.2	77.9	55.8	74.7	32.4
26. Metal-cutting belt saws	029	24.9	28.5	15.8	20.7	4.2	10.0
27. Saws or cutters n.e.s.	035	91.5	74.5	21.4	23.4	58.4	64.7
28. Emery grinders or honing machines of up to 500 kg	036	29.8	49.3	25.2	45.8	45.3	28.2
29. Emery grinders or honing machines of over 500 kg	037	335.6	472.5	255.8	204.5	120.4	690.4
30. Rectifying machines	038	2 709.4	4 147.4	1 698.9	1 751.2	2 082.4	1 759.6
31. Bench-type polishers and sanders of up to 500 kg	039	20.0	5.1	0.9	3.9	2.1	11.9
32. Bench-type polishers and sanders of over 500 kg	040	35.3	116.1	17.0	48.5	38.2	33.4
33. Manual shears for cutting material at least 10 mm thick and 2 m long	041	74.5	108.7	100.0	34.8	9.6	104.5
34. Cutting machines n.e.s.	042	2 125.8	6 527.5	839.4	1 217.5	667.8	949.9
Sub-total	-	16 720.0	30 515.6	8 972.7	10 024.6	10 019.7	11 469.5
B. Forming machines							
35. For curving, straightening and similar operations of up to 9,000 kg	84-65-001	468.2	387.0	137.0	155.0	90.0	105.0
36. For curving, straightening and similar operations of over 9,000 kg	002	223.3	1 070.5	144.7	317.8	98.8	260.7
37. Forging machines and hammers	003	936.4	441.6	72.8	175.3	656.7	145.8
38. Stamping machines weighing up to 5,000 kg	004	252.5	197.6	104.0	61.4	74.3	95.8
39. Stamping machines weighing over 5,000 kg	005	2 474.6	2 605.0	235.8	117.2	820.7	532.7
40. Wire drawing machines	006	139.1	141.2	315.8	178.9	59.8	158.0
41. Forming machines n.e.s.	007	648.5	681.4	47.3	207.0	196.9	159.7
Sub-total	-	5 142.6	5 524.3	1 057.4	1 212.6	1 997.2	1 457.7
Total	-	21 862.6	36 039.9	10 030.1	11 237.2	12 016.3	12 927.2

Source: Basic data of the Foreign Trade Portfolio.

a/ F.o.b. value in dollars.